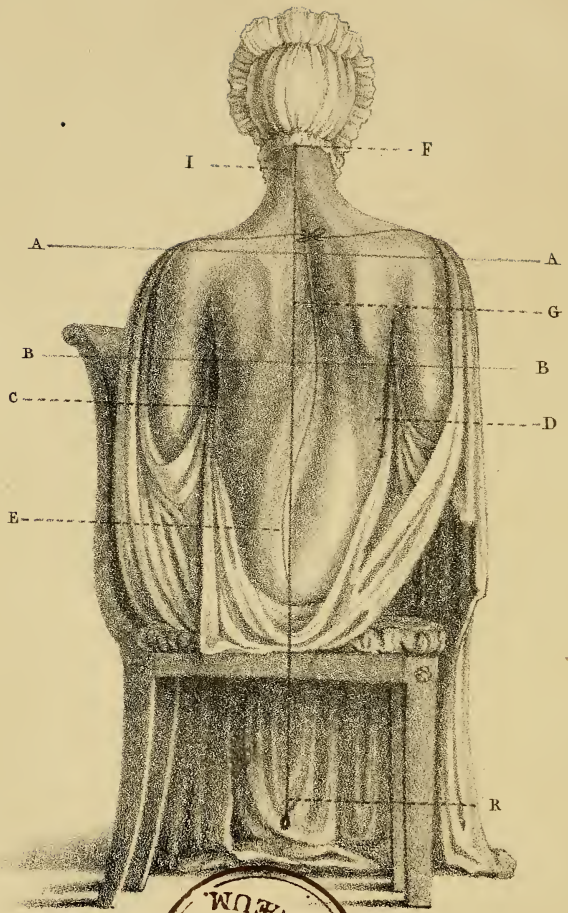

A. Thompson del. Jos.h Perry lithog.

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THE

INFLUENCE

OF

PHYSICAL EDUCATION

IN PRODUCING AND CONFIRMING,

IN FEMALES,

DEFORMITY OF THE SPINE.

BY

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EXPLANATION OF THE SKETCH.

F, R. A plumb-line dropped from the centre of the groove, which lies along the nape of the neck, to shew the natural, perpendicular course of the *spinal line.*

G, E. A line marking the deviation of the *spinal line* from the natural course, in this particular case.

G. Indicates the *central* or *dorsal* curvature of the spine.

E. The *lower*, or *lumbar* curvature of the spine.

I. The curvature in the neck.

A, A. B, B. Lines drawn at right angles to F, R.

A, A, indicates the prominence of the upper part of the right shoulder.

B, B, indicates the altered position of the shoulder-blade, and the prominence of the lower angle of the same. This prominence

constitutes the appearance, denominated "projecting," "jutting," or "growing-out," of the shoulder.

C. The depression of the lower ribs of the left side.

D. The corresponding projection of the lower ribs of the right side.

PREFACE.

THE following observations, relating to one of the most important interests of society, are especially offered to the perusal of every person engaged in the superintendence of female education.

Resulting from a careful and diligent investigation of the subject, they rest upon principles derived from a consideration of the structure, connexion, and uses of those parts of the human frame, to which they more immediately refer.

In the present day, when science is arrived at so high a state, when men in general possess so much of the information formerly confined to a few, it may be unnecessary to insist, at length, on the utility and on the importance of Physical Education, or of "the application of the resources of knowledge to the preserving of health, and to the perfecting of the human form." An inquiry into the various modes of Physical Education is, undoubtedly, one of the most interesting pursuits that can engage the attention. Health, comfort, happiness, and even life, may depend upon judicious conduct in those, to whose charge the first years of childhood are entrusted.

To assert, that none of the views

presented in the following pages have ever occurred to former authors, would be dishonest. Many of them, on the contrary, have been variously promulgated in almost every age. Repetitions, indeed, of the views of others, must be employed in every work where utility is preferred to effect, and where the humble office of instruction is more at heart than ambition for the fame of discovery. No essay, however, calculated to present a general, and at the same time a popular, explanation of the subject is, as far as I am aware, at present in the hands of the public.* As the subject is one of the utmost

* Most works written expressly on Physical Education, treat more especially of the management of it during the period of infancy, or o the first five years of life only.

importance to a very large portion of the community, and one, which every person of a well-informed mind may investigate as well as the members of the medical profession, no apology is necessary for an attempt to reduce to a form intelligible to the general reader many valuable observations, which have hitherto been confined to writings, strictly professional.

With the facts in general, which are so self-evident as to require little comment, most persons are, perhaps, already acquainted. Daily experience, however, of the little practical attention that is paid to them, if it may be regarded as any criterion, leads us to imagine that they have hitherto wholly escaped the notice of the public. Most men know, from personal

observation, that the deformity to be treated of in the following essay, is extremely common, and very correctly deem, that it is in a great measure to be attributed to some defect in modern education. What that defect is, or how it operates in producing the result with which every one is familiar, is not so generally known, yet is certainly well worthy of serious investigation.

In these remarks, designed for general readers, technical terms are, as far as is consistent with accuracy, avoided, but, where general language fails in supplying their place, are explained in a note at the bottom of the page in which they occur. The members of every profession employ a peculiar language, because the terms commonly in use are found insufficient

to indicate precisely, what is intended to be implied.

Hence, terms which have been received into common use, in consequence of their application in medicine, will be much better understood than if translated by tedious sentences. In such instances, I hold myself at liberty to chuse between the generally received expression, and its parallel, in ordinary language, selecting that, which is best adapted to my immediate object—conviction.

17, *Weymouth Street,*
Portland Place.

ERRATA.

Page 30, line 3, for *of* read *for*.
41, line 5, for *an* read *the*.
72, line 13, for *is* read *are*.

THE INFLUENCE

OF

PHYSICAL EDUCATION

IN

PRODUCING AND CONFIRMING DEFORMITY OF THE SPINE.

Among the numerous deviations from perfect symmetry in the Human form, none is more frequent in occurrence or more deserving of serious consideration, than obliquity of the Spine.

This defect presents itself under numerous varieties of form, some of which are not only painful to the sight, but a source of distress through life to the individual afflicted, and irremediable by the best directed efforts of medical skill. But the pain of the beholder originates in compassion for the helplessness and mental suffering which, persons ever so slightly deformed are known to feel when first presented in society. Sympathy, however, conveys but a faint

idea of the tormenting consciousness of physical inferiority which is perpetually haunting the thoughts of the objects themselves,—of many innocent and amiable persons, who to almost every other grace of the body add every accomplishment of the mind, and, not unfrequently, possess a vigour of understanding, that despises though it cannot overcome the paltry prejudice which converts a matter of mere accident into a source of much mental inquietude, and sometimes even into a cause of seclusion. The more highly the female mind is cultivated, the more intense must be its suffering under this state of moral exile. For, independently of the numerous coarse and unbecoming allusions to irregularities of shape in our scenic representations, and the much too frequent repetition of these in our Lyric poetry and Romance, the ignorance of the genteel vulgar, and the occasionally intemperate rash declarations of medical men, have concurred in ascribing deviations of the most purely accidental kind, to the influence of certain constitutional maladies, the very names of which

are never heard without abhorrence and disgust. Surely then he is engaged in the discharge of an important duty who endeavours to contribute something at least to alleviate the sorrows, and if possible, obviate the sufferings of many of the fairest portion of his kind.

Cases of the nature last alluded to, either arising from disease, or connected with malconformation of some portion of the spinal column, are not so common as is generally apprehended. Fortunately the form under which the deviation most frequently presents itself, is not of a serious nature; nor is it beyond the reach of surgical skill. This form is technically denominated *lateral curvature of the spine*, popularly *permanent inclination of the backbone, either to the right or left side.*

This kind of deformity we learn, from an attentive perusal of the more ancient authors, was by no means uncommon among females in the earlier ages; while towards the close of the 16th century, it became so prevalent, that Pinæus, who flourished about the year 1580, asserts "*that of fifty females of the higher*

or more civilized ranks of society, scarcely two could be found who had not the right shoulder higher, and more projecting than the left." An assertion which but slightly modified, may with considerable truth be applied to females of the higher and middle ranks of society, in the present day.

The permanent inclination of the spine, to either side, by no means *necessarily* depends, either upon original debility of constitution, or upon active and manifest disease, though its production or confirmation in persons of a scrofulous tendency, cannot be denied to be in some measure due to the somewhat soft, and imperfect state which the bones are known occasionally to retain, in such individuals, even to a late period of life,* aided perhaps by an otherwise delicate physical conformation of the whole frame.

In the absence of any such constitutional

* In cases of this description, the bones do not acquire a sufficient degree of solidity to withstand unnatural pressure, or injurious muscular action, before the 16th or 18th year, or even later.

debility, the primary causes of this deviation from the erect position, natural to the human figure, are indisputably the result of advancing civilization; and may fairly be traced to sedentary and other erroneous habits, acquired most generally at fashionable seminaries, or during a similar routine of education under the paternal roof—in fact to an injudicious system of school discipline, to neglect or actual mismanagement of the physical education of young females, to the vitiated state of public taste, with respect to the perfection of female attire—and to many absurd customs and useless restraints of society, derived from the vain and ludicrous efforts of modern fashion to attain the very highest point of refinement.

It has been the fashion with many to indulge in much rather unmeaning declamation, with respect to the mode of life adopted by teachers and parents for the education of female youth, and to speak of the rules they prescribe, as if they were the pure offspring of the whim, caprice, worldly-mindedness or ignorance, of these natural superintendents of

an unprotected age. There is but little justice in this insinuation, since, as may easily be shewn, they are themselves in point of fact not the leaders, but the led, not the constrainers, but the constrained. In the first place, it never has been much the fashion for young men to unite themselves with old or middle-aged women in any age or country; and though our valiant und sagacious ancestors, in the woods of Germany, forbade males to marry before the fortieth year,* yet it does not appear that their choice, on then emerging from celibacy, was confined, either by law or social practice, to ladies who had passed that period. On the contrary, we are told that they were in the custom of selecting their wives from among the young; and that however much they venerated old ladies for their wisdom, and prescience of future events, yet that this peculiarity of national character did not lead to any corresponding anomaly in their domestic affections or matrimonial engagements. Such then being the almost universal

* Tacit. Germany.

preference to youth, it follows that parents or guardians, who justly—or otherwise—deem the state of marriage the most happy and natural in which a female can be placed, must be solicitous to complete her education before that period of her life be passed, within which her chances of forming a suitable alliance are chiefly confined. It appears, by the statistic registers of Paris, that by far the greater number of married women have become wives before the completion of their twenty-fourth year, and that more women are married in their twenty-fourth, than in any other year of their age. If we now consider how many marriages take place, of the kind named *prudential*, and which may be said to consume on an average from four to six years in their arrangement and preparation, compared with those resulting from love, or a sudden prospect of advantage, and concluded within a few days or weeks, we shall see that between the sixteenth and eighteenth year, about the period when a girl is in general fit to emerge from school, is by no means too early for her introduction into that world, of which her

chance of afterwards becoming a happy member, lies principally within such narrow limits.

Nor is this all:—The ambition, for an object "that makes ambition virtue," of forming an advantageous engagement, often animates alike the breast of father, mother, guardian, and child, and affords an additional motive for the early accomplishment of female youth, since, leaving out artifice and intrigue, which can have no place in honourable minds, and are never contemplated in the education of children, even by the unprincipled; experience shows that desirable alliances are chiefly attainable through the early acquisition of female attractions.

The only practicable improvement, then, which can be made in this early cultivation, is so to conduct its various steps, that the mind and the body may lose nothing of their native vigour.

But how, it will be asked, is this great and truly desirable object to be obtained? *Abridge the study and increase the recreation!* This brings us insensibly to a second

cause of the deprecated evils in which parents or tutors have scarcely any other than a passive share.

From the tremendous "march of intellect," and the vast diffusion of scientific knowledge, which distinguish the present age from the last, and the last from that before it, it is clear that the absolute *quantity of information* necessary to be acquired by young females, has "*increased, and is increasing;*" I will not venture to add, "*ought to be diminished;*" whilst the time within which this is to be obtained, may be said to be, though indirectly, yet materially *shortened*, in as much as the period allotted to school-study is, we have seen, from various moral causes, necessarily limited to a given age. Here then arises one of the most serious evils of the present system; more is expected to be learned than ought to be reasonably required of youth, or than can be performed within the limits assigned, consistently with health.

But the *study-life* of females is shortened from numerous other causes. The *habit of early rising*, which distinguished our ancestors,

afforded the long and precious *morning hours*, which every true student knows how to value, and which lately have been well, though rather egotistically, recommended by that ingenious mercenary of politics, Mr. William Cobbett. A mind duly refreshed by sleep, and unoccupied by other cares, will for the most part make as much progress in one hour in the morning, as in two hours of the afterpart of the day: the study too proves less exhausting, and can therefore be longer continued with impunity.

The *study-life* of females is also shortened by the *increasing tenderness of mothers;* who, from the influence of fashion, luxury, and mental cultivation, have brought this feeling of maternal affection, which is steady and moderate in the natural and uncivilized state, to a degree of exaltation, which, besides being ludicrous, is altogether morbid, and frequently ends in the misery and ruin both of parent and child. All we have to do with it at present, is to remark, that from this very reprehensible cause, girls are often too late in being put to read, or they are taught by means of a governess living in the

family, and who would soon find her situation insupportable did she not comply with a mother's modes and seasons of instruction, which are not in general very rigorous; and it may be inferred, that the progress is seldom rapid, though the governess, not the system, bears the largest share of the blame. But a more common error, as will afterwards appear, is a premature direction of the infant mind to study before the evolution of the judging and reflecting powers.

The *study-life* of a young lady is also shortened by the minute attention to *fashion*, which distinguishes modern females; and this extends equally to the modes even of eating and moving—as to the adjustment of their apparel. Formerly, all these items, if not absolutely fixed, did not vary much in the course of a century or reign; but evanescent and complicated as they are at present, they must necessarily consume a great part of that staple of existence—Time.

Lastly, much time is unnecessarily taken up in female seminaries, in unskilful attempts to

prevent, and efforts, generally unavailing, to correct deformities of the person. Days and weeks are expended in this manner, and it may be said needlessly; since were the system of physical discipline founded on a different principle, there would be no necessity to anticipate any evil, and cases would but rarely present themselves requiring correction by any but natural means.

Moreover, there are resulting from the present state of society, several powerful causes that produce a remarkable influence on the modes of modern instruction, and which, by over exerting the mind, and abridging the time allotted to recreation, tend materially to favour the formation of diseases of the spine.

The first of these is the immense competition which is to be met in every line of employment, and in none more universally than in that which embraces the superintendence of female education. The necessitous in every relation of life, the daughter, the widow, the mother; and of these the number is continually being multiplied by the increasing taste

for pleasure or luxury: all endeavour to relieve their wants, or to raise their fortunes, by a draught on this common fund, the education of children.

Now admitting, what is very questionable, that all these competitors for public favour, if not capable of undertaking the immediate or practical part of instruction, are sufficiently acquainted with the principles of education to superintend the studies of youth, it does not follow that they are at all versed in those of physical discipline. In truth comparatively few who undertake the early instruction of females know anything of the principles of physical education; there is a beaten course which, it may be said, they mechanically pursue, without ever once thinking of investigating its ultimate influence on the natural operations of the delicate and irritable parts which compose our system. Indeed, they are unacquainted with the mode of instituting such inquiry; it is the province of the physiologist; all they can understand is the present apparent good. It is not by these hints intended to convey any cen-

sure on the ignorance of teachers and superintendents in this respect, because not only is the subject one of acknowledged difficulty to all those who have ever troubled themselves to investigate it, but it is one that the general course of the preparatory studies of even those designedly educated for teachers does not lead them to inquire into.

Moreover, if there are, as in other professions, a sufficient number of persons expressly trained for the office of instruction, it is clear that the above immense irregular additions to this number, will have the effect of producing an unusual degree of competition. Of this the immediate result must be, attempts to excel each other, and a laudable emulation to obtain their common object, public confidence, wealth, and consequence. This may give rise to a positive improvement in the art of teaching, but it will be, in general, at the expense of the physical development of the taught. The improvement reaches, as was intended, the ears of parents and guardians; they hear, and often in an exaggerated form, of the

progress made by the pupils at a particular school, and naturally decide upon availing themselves of the abilities of so eminent a teacher in the case of their own children. It is by a reputation of this kind that all our fashionable boarding-schools are filled: recommendation does the whole; and as the presence of a few noble children in a seminary of this class will go farther to extend that reputation than the praise of ten times as many commoners, it is clear that ideas of *fashion* and *fashionable connexion* also mix themselves with those of *utility* in the minds of the guardians of youth. In short, the English nondescript idea of *respectability* includes all these, and, possibly, something of the good principles of the teacher in addition.

But before entering his child at such an institution, the parent ought to ask himself how, and at what cost all this superiority is acquired? Is it by adopting more natural systems of the individual arts and sciences they teach, so that the memory is neither wearied nor disgusted? Or is the succession of

the whole of these sciences so adapted, piece by piece, each one to the other, that the scholar finds everywhere something that is past, with which she may connect the something *new* that follows? Or are there arrangements made in these establishments to obviate the several causes which, in modern times, as we have seen, tend actually to shorten the legitimate period of study? Or, lastly, does the person any where exist so well acquainted with the powers of the human understanding, and the passions of the human heart, as to be able, through them, to wield at will, to excite or fix at pleasure, the *attention* of the human mind? Let him depend upon it, if he fails in obtaining an affirmative answer to these questions, that the method pursued here, however sophisticated by pretence or innocent ignorance, produces extraordinary improvement only by employing extraordinary hours: that is to say, by extraordinary extension of the time of study, and consequently by extraordinary invasion of the period of recreation. In the Establishments named *Finishing schools*, their sub-

jects are usually grown-up girls, who come there in health, and are expected to remain but for a short time. The discipline is therefore more rigid, the invasion on the time allotted to recreation is greater, and as is proved by experience, at this period the greatest mischief is frequently done to the form of the body. Unfortunately the conductors of elementary schools, taking into consideration only the advantages to be gained by the compendious system pursued in the finishing establishments, are every day approaching more and more to the intense exertion required by that system. They forget the difference in the age and understanding of the persons upon whom they wish to produce similar effects, *and they know not, that they are operating upon a frame-work of bones, divided into at least three times the number of pieces that compose it when arrived at the adult age, and which at present are very loosely connected together.* Every long bone in the body consists of three separate pieces in the child, and these do not unite

perfectly till the sixteenth, eighteenth, or in certain habits, even the twentieth year. Few teachers have any conception how much the natural growth is impeded by excess of study, and as the *additional* encroachment that each instructress makes upon the time of recreation is not very great, they are not likely to observe much difference between their own method and that of others, as far as regards the preservation of health. When however the spine gives way, there is always a voice in readiness to pronounce it the effect of hereditary disease.

Another powerful cause which leads to this premature severity in education, is the *general advancement of knowledge.* Many girls, long before the period at which they are sent to school, betray all the curiosity and acuteness characteristic of the sex; and from the conversation of those around them, frequently acquire a considerable share of knowledge before they leave the paternal roof. These facilities of acquiring information are in a great measure due to the very attrac-

tive form of many of our "juvenile publications." By the aid of fable, narrative, and the productions of the graphic art, a young lady of the present day often enters the seminary with more information in her head, than occupied that of her grandmother upon leaving it. But this superiority of acquirement only leads to the imposition of harder duty in the school-room! Mrs. A. has seen and admired the wonderful progress of Miss B. at a school examination, and without ever stopping to ask the questions propounded above, or even whether this young lady may not be simply an instance of precocity, makes every exertion in her power to render her own daughter a rival, at least, to the object of her admiration. He is either very charitable or very simple who is not fully persuaded that rivalry of this kind exists; nor does he require any great study of the human frame to enable him to comprehend that much incurable mischief is often occasioned by these well intended, but injudiciously directed efforts at the attainment of an imaginary excellence. To praise a young lady for being highly

accomplished, is often enough to make a whole bench of matrons glow with emulation. However much akin to envy, it would be cruel to censure this passion, the principle of which is honourable and just. Enough that it is a *passion*, and that when predominant, it often proves injurious to the delicate female, beyond even the worst wishes of an invidious rival.

Still it must be remembered, that this rivalry of parents and guardians, like that of teachers, has its origin from without. Whilst the heart and passions of man continue the same, the same effects may be expected to spring from similar causes. Till the eyes of parents are opened to the evils finally resulting from excessive competition, it is neither rational to expect that these evils will cease, nor just to insinuate culpability in those who are but yielding to the deductions of their own understanding, and the influence of some of the best principles of human nature.

Hitherto my observations apply to a department of education, regarding the principles of which, and the practice founded upon them, the

opinions of mankind are continually fluctuating. They are now to be directed to the investigation of a subject on which my readers may fairly be considered to be less open to conviction.

An attack openly made upon existing prejudices of the worst kind, those which flow from long continued and favourite customs, sanctioned and supported in the female mind by a firm belief in the valuable aid they impart to the graces of nature, can scarcely be made without exciting against its author some degree of distrust, and may, perhaps, expose him to the ridicule or contempt of the unreflecting and the ignorant, but will, he is confident, meet with support from the more serious and better informed portion of his readers.

The present, however, is by no means the first effort that has been made by professional writers to direct attention to this interesting subject, and to stem the tide of popular error. As early as the year 1550, we find medical men engaged in investigating the nature, causes, and best means of preventing this deformity, and in pointing out the simple attentions by which it

may be removed, and the necessary precautions against its return. Nor is it difficult, when the female costume of that period is taken into consideration, to find satisfactory reasons for the advice there given:—"the discontinuance of corsets and other bandages calculated to disfigure the human frame." *

From the gradual and insidious manner in which any deviation from the natural position of the spine takes place, the evil may attract little or no notice, until such time as it has produced confirmed deformity. When the attention of parents is roused, the most injudicious treatment, founded on a mistaken view of the nature of the malady, is not unfrequently adopted. The remedy indeed is sought in an accumulation and more rigorous observance of the very practices whence the evil originates, in the imposition on the part of the governess and dancing-master of additional restraints to be enforced by the application of such machines, as bandages, unyielding corsets, back-boards, and perpendicular-backed chairs.

* Knox's Prob. Essay, p. 7.

A particular detail of the evidences of a deformity with which almost every one is familiar, is perhaps unnecessary. There are few mothers or teachers who have not seen the "jutting shoulder." The child arrived at the tenth or twelfth year, perhaps at an earlier period, has already spent a twelvemonth or more at some private seminary, or has been placed under the especial superintendence of a governess living in the family, whose sedulous attention to the personal appearance and carriage of her pupil is remarkable; yet, in spite of the exertions of the governess or school-mistress, it is observed that the child is becoming crooked. The right shoulder projects more than is natural, and is, in common parlance, said to be "growing out." The course of the central groove* of the back deviates from a straight line, a greater distance is observed between a given point of the original perpendicular *spinal* line and the top of the elevated

* Some of the vertebræ of the back are situated between the blade-bones, and when the form is natural, fall gracefully inwards at this point, forming a groove.

shoulder-bone, than between the same point and the corresponding top of that of the left side. These appearances, together with a remarkable prominence of the lower-third of the shoulder-blade of the distorted side, alarm the parents, now surprised at the extent to which the deformity has proceeded without having attracted much notice.

The gait of the young person appears awkward and shuffling; her clothes cannot be made to sit well upon her—they appear to be drawn to the right side. The sash encircling her waist is observed to dip towards the same side, while the right breast presents a remarkable fulness,* and the corresponding collar-bone displays a proportionate elevation.†

* When the deformity is not noticed till about the fifteenth year, the state of the breasts most frequently first attracts attention, one appearing larger than the other, and growing so unequally as to lead to a suspicion that it is diseased.—*Shaw on Deformity.*

† The symptoms in the text are those which denote inclination of the spine to the *right* side. But it may be observed, that the obliquity does not, as the epithet *lateral* would imply, invariably take place to the side; this is

In short she is crooked; her back-bone is distorted. In a multitude of instances, even in this early and remediable stage, absolute and permanent deformity can be prevented only by care and attention of no ordinary kind, directed upon principles derived from a thorough knowledge of the nature of the parts affected. In proportion as the inclination takes place in the upper part of the back between the shoulders, nature, in order to counterbalance the evil, and preserve the equilibrium of the body, calls into action the muscles of the lower part of the spine; these operate with proportionate power on the opposite side, so that, in confirmed cases, there is in fact a double curvature produced, as exemplified in the lithographic sketch facing the title-page.*

only the most frequent direction it assumes. The spine may form an *incurvation* from behind forwards, or an *excurvation* in the contrary direction, and sometimes these varieties are complicated with each other.—*Bamfield on the Spine.*

* The sketch is intended to illustrate the mode of ascertaining by measurement the extent of the deviation in examples of lateral deformity, and will enable any one

As the distortion advances, a similar counterbalancing power is exerted by the muscles attached to the spine in the neck, and a third, or *upper* curve is then formed, so that the spine presents, in fact, a serpentine appearance, inclining to each side alternately. The ribs, in consequence of the alteration in the course of the spine, deviating from their true direction, partake of the change instituted. Finally, the basis, or *pelvis*, on which the spine rests becoming involved, produces an inequality in the size of the hips, the contrary of that which presents itself in the shoulders, and causes the whole body, when viewed from behind, to appear as if twisted on itself. *(Vide sketch.)*

When the deformity is really ascertained to exist, there is every reason to suppose that the system of school discipline the child may be pursuing, is erroneous. The parents should

to submit a doubtful case to this most accurate of all tests. When, however, the deformity arises from other causes, as from malformation of the pelvis or base on which the spine rests, the mode of measurement delineated will not detect the full extent of the evil.

immediately take alarm, and a different system, founded on more scientific principles, should be adopted.

Let it not be argued that the girl will "outgrow the deformity;" She never will. This, though a common, is a very erroneous and dangerous notion: the parent who rests his hopes on so fallacious a foundation must ultimately be disappointed. The longer the deformity exists, the more conspicuous it is sure to become.

When established to any considerable extent, artificial means, however well applied, aided even by the best devices of the milliner, fail in concealing the deformity. During childhood—backboards, unyielding stays, constrained positions, concealed pressure,* and similar means, are employed with a view to "force in the projecting shoulder," erroneously said to be "growing out;" a mode of proceeding almost invariably productive of injury to the

* It is a prevailing custom to bind over the projecting shoulder a piece of lead, which is concealed under the dress.

form of the chest, for it is only at the expense of the just configuration of this important part of the system that such means can exert even an apparent influence in remedying the evil. The real origin of the injury not being suspected, a judicious mode of effecting its removal is scarcely ever employed. At a later period of life, mechanical means, being found ineffectual in restraining the progress of the mischief, are abandoned. Such distortions are observed to be by no means uncommon, and, like other evils in common occurrence, are supposed to be irremediable, and considered of comparatively small importance, particularly as they neither incapacitate the person for the fulfilment of the ordinary duties of life, nor appear to affect the probable duration of existence. Artifices of dress are now substituted for mechanical contrivances, and the manipulations of the waiting-maid supply the place of surgical skill; or in more pointed cases, the machinist is resorted to, who not unfrequently aggravates the mischief he promises to cure.

In some cases indeed, the eye of the ordinary observer may readily be deceived by the arts of modern dress-makers, as well as by various mechanical contrivances, but rarely that of the anatomist or artist, however skilful or judicious may be the mode of applying them. Nay, even when these arts are most successful, the shuffling gait—the ungraceful motion of the feet—the unsteady carriage—at once enable the observer to detect the existence of an evil which, artifice apart, may by the aid of measurement be rendered apparent to the most superficial observer. *(See engraving.)*

To give the general reader any just comprehension of the manner in which the fashions and customs pointed out (page 5,) are influential in giving rise to, and in confirming, the deformity we are considering, will be a difficult task, unless he be first put in possession of some general knowledge regarding the structure of the flexible column of bones, popularly known by the name of the "*back-bone;*" and of the means which nature appears to have

provided for preserving the symmetry and upright direction of this column, and at the same time of rendering it applicable to the various purposes of life. Possessed of this information, he will be prepared to understand and to appreciate how far her intentions are baffled or subverted by the agents in question.

The column of the back consists of a pile of small bones, technically denominated *vertebræ*, twenty-four in number, placed one above another in succession, so as to form a bony pillar finally surmounted by the head, which may be considered its capital.

These small bones are connected together by the apposition of certain *processes*, (for it is thus anatomists name the smooth and polished projections,* growing from bones) maintained continually in their relative position, and in contact, by means of small bundles of strong white elastic fibres† attached firmly to the margins of the processes in every two bones so connected together. By the skilful

* Technically, articulating processes.

† Technically, ligaments.

disposition of these polished projections, provision is made for allowing the column to be bent in almost every direction, as the wishes or necessities of the individual may require. Through the centre of this column runs a somewhat trilateral tube, for the purpose of containing the marrow of the backbone;* and on its summit rests the head, usually in an adult from seven to ten pounds troy† in weight. A plane dividing the crown of the head, in the direction from before backwards, and continued vertically to the ground, when the individual is standing erect and looking straight forward, in the natural state, divides the back-bone into two halves. The spine, therefore, in relation to the plane on which the person stands, and which intersects at right angles the dividing plane may be said to be *vertical*, although it is also naturally curved *anteriorly* and *posteriorly*. The vertical position is maintained, while the column itself is enabled to bear the weight of the head without yield-

* Spinal marrow, or spinal chord.

† The brain alone is four pounds, the cranium three pounds.

ing under the burthen, and also, after performing all its various inflexions, to regain the vertical position by means of two very considerable masses or cushions of muscles,* placed one on each side of it, and attached to various projections from the individual bones. So admirably are these muscles arranged, that when left to nature, and uninjured by vitiated habits, they have the effect of exerting such a balancing power over every separate bone upon that placed immediately beneath it, as to keep the whole pile of bones not only at rest, but absolutely upright in regard to their lateral aspect.

Now it is a law of the animal economy, that whenever the natural and healthy operations of any organ or set of organs, are either not regularly, or not sufficiently exercised, the organs whose operations are so disturbed or omitted, suffer material injury in a proportionate loss of their capabilities of action. In some instances indeed the derangement so produced gives rise to active disease.

* Muscles may be defined, bundles of fleshy fibres, capable of contracting by the exertion of the will.

Again, organs, when they are too much exerted, or when their natural operations are kept up beyond certain limits, become fatigued and incapacitated for the performance of their wonted office, until by repose they are enabled to obtain a renewal of their exhausted nervous, or vital energy.

From a careful consideration of these two principles, the mode in which the circumstances, already enumerated, prove influential in giving a tendency to, or in permanently confirming inclination of the back-bone, may be easily gathered. They interrupt, or wholly prevent the operation of one class of muscles attached to the bony column of the back, and they exert unnaturally, in an injurious and protracted action, the operations of a second class; the effects resulting from which irregularities may be traced in the following observations.

The uses of the two layers of muscles ranged on either side of the back-bone, as has already been stated, are to keep that column vertical or erect, *i. e.* upright from the ground, (in relation to its lateral aspect,) when the

person is at rest, and moreover, to enable it to be bent at will in any requisite direction within given limits, and to secure its return to the previous vertical position. In order to provide for the due performance of these operations, it has been explained, that these muscles exert a kind of balancing power on each individual bone, so as to keep it properly poised upon the one immediately beneath it. It is evident then, that the free and unimpaired action of every individual muscle is necessary to the absolute integrity of the vertical state of the column.

Now, the restraints of modern female attire prevent a due and sufficient action of many of these muscles, and by interrupting entirely, at least during the day, the action of some, and by leaving others free to be called into motion, induce, in most instances, constrained positions of the figure. What lady indeed, when dressed and properly laced in corsets furnished with steel, bone, or wooden busks, can bend her back, *keeping at the same time her knees together, and her whole lower limbs straight,*

while she is stooping forward to raise a pin placed at her toe?* To tie her own shoe-string even, is an effort requiring from the fashionably attired female, not a few manœuvres, and only to be accomplished by her assuming a constrained posture. Remove, however, the constraints of dress, and she instantly complains of weakness in her back, of inability to support herself erect. Nor is it matter of much wonder that she does so complain. Because certain of the muscles necessary to aid in her efforts, have, by a long continued state of inaction, lost that poising power, which they naturally possess independently of the exertion of the will, and which is scientifically called their '*tonicity;*' have lost their power of being influenced by the will, (their contractile power,) and, not unfrequently being actually wasted in substance, have become so

* She will attempt this by bending the trunk of the body forwards upon the *hip*, rather than by curving the back-bone, the various joints of which, in point of fact, do not admit of any great extent of incurvation at its *upper* part. Even what incurvation they do allow is thus prevented.

weak as scarcely to be able to support the body, or to perform any of the ordinary duties for which they are designed by nature. An attempt is made to compensate for this failing of the natural powers by the use of tight dresses and corsets, the very sources from whence it springs—clumsy substitutes, moreover, for the inimitable contrivances of nature, thus too early sacrificed at the shrine of folly and caprice. "Persons adopting such means," says an eminent French writer, (Portal) "are sure to become distorted whenever the artificial props are removed." Nor in such case, when deformity is produced, does discontinuing the use of stays remedy, but rather tend to aggravate the evil. When once the spinal muscles have become debilitated, so that the body has been habituated to depend upon artificial support, that support must be removed with great caution, otherwise its discontinuance will increase the very injury proceeding from its use. That much injury also may arise from corsets being improperly made, or badly adjusted, is too apparent to require comment.

It is equally superfluous to do more than hint at the bad effects resulting from the confinement of the chest which they produce, with respect to the organs of respiration, particularly in young persons constitutionally predisposed to consumption. Besides, the impediments which they offer to the proper motion of the stomach and of the bowels, and the consequent imperfect digestion of the food,* cannot fail to lay a foundation for

* It is well known that many young ladies, who are accustomed to lace tightly, are occasionally under the necessity of relaxing their stay-lace after dinner, in consequence of the uneasiness experienced from this cause. It is by no means uncommon for all the symptoms of diseased heart to arise from the same source, and which are speedily removed by a discontinuance of so injurious a practice.

The baneful influence of tight lacing on the form of the lungs and liver, is familiar to every one who has had an opportunity of spending a winter in the dissecting-room. These organs are often found moulded into shapes the most distant from the natural; conforming, in fact, to the unnatural configuration imparted to the chest and lower ribs, resulting from long continued injurious pressure. How then can they be reasonably expected to perform in a proper manner their peculiar functions, essential as these are to the preservation of perfect health.

the most distressing complaints, and not unfrequently to induce a premature and painful decay in all the powers of life. It is not intended to condemn the use of corsets or stays, but only to deprecate it under the present fashion. The etiquette of society, and the present state of refined feeling, naturally impose certain restraints on female dress, as well as on female habits: it becomes therefore necessary to have recourse to artificial means, in order, in some measure, to counteract the injurious tendency resulting from these restraints in a physical point of view. A moderate and equable degree of compression and of support, given to muscles much called into action, so that it does not unduly interfere with the power of contraction, possessed by these instruments of the will, is undoubtedly beneficial. Such compression and support may be most advantageously derived from corsets when well made, and destitute of back bones and of busks, their operations, when so furnished, being eminently destructive, in as much as they interrupt, or wholly supersede

the action of the class of muscles devoted to supporting the trunk of the body; and impede, or entirely prevent many of the natural inflexions of the spine. The application of these mechanical agents being a bad substitute for the adequate and beautiful provisions of nature, can therefore only be defended by prejudice and caprice.* Stays certainly prove

* The following note, copied from Mr. Shaw's excellent Treatise on Spinal Distortion, which he quotes from an essay, entitled, "*A Comparative View of the State and Faculties of Man with those of the Animal World,*" dedicated to Lord Lyttleton, being the opinion of a sensible and observing man, is well worthy consideration.

"Some nations have fancied that nature did not give a good shape to the head, and thought it would be better to mould it into the form of a sugar-loaf. The Chinese think a woman's foot much handsomer, if squeezed into a third part of its natural size. Some African nations have a like quarrel with the shape of the nose, which they think ought to be laid as flat as possible to the face. We laugh at the folly and are shocked at the cruelty of these barbarians, but think it a very clear case that the natural shape of a woman's chest is not so elegant as we can make it, by the confinement of stays. The common effect of this practice is obstructions in the lungs from their not having sufficient room to play, which, besides

doubly injurious if used before the body has acquired its full growth, though during the period of developement they are more particularly worn, it being found, that at this period, especially, the body is capable of being moulded into any shape the fashion of the time may consider most becoming. How is it possible that health can be preserved, that the physical powers can acquire their full energy, or that the form can be symmetrically developed, when squeezed and laced into a pair of fashionably made stays, "*Corsets Parisiens*," such as we daily see paraded in the windows of the more favoured

tainting the breath, cuts off numbers of young women in the very bloom of life. But nature has shewn her resentment of this practice in a very striking manner, by rendering *above half the women of fashion deformed in some degree or other*. Deformity is peculiar to the civilized part of mankind, and is almost always the work of our own hands. The superior strength, just proportion, and agility of savages, are entirely the effects of their hardy education, of their living mostly in the open air, and of their limbs never having suffered any confinement."—Page 194.

milliners' shops of the metropolis. These are made according to a given fashion, and one pair varies from another only in size. It matters not whether the prevailing fashion be suitable for the natural shape of an individual, the lady must be moulded into, and submit to be modified by these machines in whatever manner the folly of the time considers most proper.

The fashion is generally designed by some of the more celebrated "*Marchandes des Modes*," who change it as best suits their own caprice or interest, without any reference to what nature in such a case, if consulted, would suggest.

If ladies are determined to vary the fashion of this part of their dress, would it not be desirable to establish a committee of taste, selected from the better-informed ranks of society, from which one might at least expect the changes instituted to be founded on something like rational principles, and calculated to put a stop to prejudice, and to annihilate pernicious habits. It would not, surely, be a difficult matter to construct a dress in strict

accordance with good taste and propriety, not in the least interfering with the operations of nature, and capable of being varied in an infinity of ways. It is absurd, nay criminal, to allow the rules and caprices of fashion to prevail to the prejudice of health.

Persons arrived at a certain period of life, who, from an early age, have been habituated to the use of artificial means for the support of the body, and whose conformation has, of course, suffered accordingly, find it almost impossible to lay aside the use of stays; but the child who never has required mechanical support, never will require it, provided the system of physical education be constructed on better and more scientific principles.

The prevailing notion among females appears to be, that corsets not only prevent, but have a tendency to remedy distortion of the back. The mechanical support they afford, and the artificial shape they impart, are alone taken into consideration in the formation of this opinion. The indirect and injurious effects they produce, by sapping the very foun-

dations of natural vigour, are either never adverted to, or are not permitted to have their due influence on the mind. Were these important circumstances allowed to have any weight, girls, at least, would not be suffered to wear tightly-laced corsets furnished with steel, bone, or wooden busks. In young women arrived at that period of life when the structure of the bones becomes firm, and more capable of resisting the influence of irregular muscular action and the bad tendency of injudicious pressure, corsets of the description deprecated, though still, on the same principle, improper, are by no means so liable to affect the symmetry of the *spine*. We do not observe that men, the children of the poor, or peasant girls, who generally yield from childhood to the impulses of nature, and who sit in any posture that ease or temporary convenience may dictate, are the more liable on that account to the affection we are considering. Such persons, on the contrary, are generally remarkable for the symmetry of their form, unless, indeed, they may have been confined, from

an early period, to the desk, or occupied in some sedentary mechanical pursuit.*

Thus far our attention has been principally directed to the influence of partial impediments to the proper and relative action of certain of the muscles destined to keep the body in equilibrium, in producing or confirming deformity of the back. We shall now proceed to investigate the second set of circumstances alleged as the cause of such deformity, viz. *unduly protracted or excessive exertion of the muscles that support the spine.*

It seems proper to explain, at some length, the circumstances which render young girls in public schools, so liable to spinal distor-

* Hacquet, the naturalist, one of the Emperor Joseph's professors, who examined, in detail, several of the finest provinces in Turkey about the commencement of the French revolution, attributes the cause of the superiority of the Turks over the Western Europeans, *in a physical point of view*, to the looseness of their costume not subjecting the body to any constraint, and to the nature of their pursuits; and he asserts that both the men and women are much better formed than us, and more beautiful.

tion, as also the causes which increase this predisposition. The exciting causes assigned in the former pages of the present essay, and in the writings of others, may easily be comprehended when once the elementary circumstances upon which their operation depends are rendered intelligible to the general reader.

The human body, as far as regards our present investigation, may be considered "*as a machine composed of many distinct levers, moveable one upon another in various degrees both of extent and velocity.*"

The levers of the human body are, generally speaking, bones. The powers that move them are the red flesh, or MUSCLES.* The muscles, indeed, may be said to be the only parts of our bodies which move spontaneously, and when they do so in an unusual degree, they give rise to those violent contortions of the

* So called from a Latin word, "musculus," a *little mouse*, because one of them is seen creeping like a mouse under the skin of the temples when we eat; and all the other separate pieces of red flesh being found to move at times in like manner, were named *muscles* from the same resemblance.

body and limbs, named *fits.* Though in a piece of fresh beef the flesh appears to be only one mass, it is in reality divided into many separate parts, each having a distinct office to perform in the body, held to be an individual muscle, and having a proper name to distinguish it in the language of anatomy. Each muscle consists of a number of small bundles of fibres, which again consist of smaller bundles of fibres, a kind of structure easily to be understood by the general reader if he examine attentively a common transverse slice of boiled ham. By cutting the slice about half an inch in thickness, and tearing off the fibres laterally, he will readily see the manner in which these bundles of fibres are adapted to each other. In short, he will find that a muscle is merely *a rope*, whose threads or strands lie parallel, and are not twisted together; that, if these fibres possess the power of shortening themselves, (technically named *contractility*,) and are inserted into a bone, or lever, they will, in exerting this power, have the effect of turning this

lever round upon its supported end. For they cannot bring their extremities nearer to each other without also bringing along with these the body, or bone, into which they are inserted. In order to facilitate this action, nature has made the ends of these bony levers remarkably smooth and round, so that they may move very easily one upon another; and between some of them has inserted moveable, but well-fitted pieces of gristle, which greatly facilitate their motion. This is the case with the more important joints, as those of the lower jaw, of the back-bone, of the thigh and of the knee. Nothing is more easy than to find out the direction in which a muscle acts—we have merely to look at the direction of its fibres, and to examine whether there is any thing in the nature of the joint, or in the point of support that prevents the lever revolving in the same direction with the fibres. If there be any mechanical opposition, its effect will be evident from its form and relation to the point of support. For example, when the mouth is open, if the fingers be pressed on the

temple, while an effort is being made to close the teeth, the fibres of the *muscle* of the temple will be felt drawing themselves up under the fingers into a kind of tumour, which becomes more conspicuous the nearer the jaws approach each other, the fibres of this muscle extending from the temple to the lower jaw bone. But if a piece of ivory, or the handle of a pencil be placed between the teeth, it is evident that the jaw cannot rise beyond such obstacle, although the fibres may still be felt acting under the finger. So too, in curvature of the spine, accompanied with that disease of its bones, which frequently glues them immoveably together, the muscles may be felt, under the skin of a thin female, still to continue their ineffective efforts to raise the back into the erect posture; a result which could only take place were they strong enough to overcome this agglutination.

All the muscles necessary to be considered in the present essay, are found to be thrown into their action of drawing themselves together in obedience to our will, by directing our atten-

tion to the particular motion they are known to produce. This *volition* is the general cause of these motions. Hence they are denominated willed, or *voluntary* motions, and the muscles, that produce them, VOLUNTARY muscles. By habit we are enabled to perform all these motions with any degree of force within certain limits. The power also of performing these actions varies according to the state of our general vigour, or health:—hence when the general health is good, the moving powers are at their height, and when it fails, they decay along with it. For this reason boxers, wrestlers, and runners, endeavour to raise their health to a high point, by a practice named training, before they attempt the performance of their feats.

Sometimes the muscles are attached to the bones not immediately by their fibres, but by a hard shining cord, named a sinew, such as may be seen in the separated leg of a chicken. But whether attached by red fibres, or by sinews, it is clear they possess considerable strength;

since they perform all our motions with great force, though sacrificing much of their power from the peculiar mode of their insertion,* and yet are scarcely ever torn or broken. They are disposed in pairs, a muscle for the right, and a muscle for the left side; and though the bones on which they rest are deeply impressed by their action, and though they rarely act in pairs at the same instant, never, except in those particular conditions we are considering, occasion the smallest deformity by this inequality in the time and force of their contractions on opposite sides. Moreover, dissection shows,† that in the deformed no inequality of the muscles, from which an explanation of the lateral curvature may be deduced, is to be observed. The muscles, in-

* The muscles are for the most part inserted into the levers or bones near to their rotating or supported extremities, and thus from their being applied to what mechanics call levers of the third kind, lose a great portion of their power.

† Bamfield.

deed, are often smallest and weakest on the side towards which the body is drawn, and are scarcely ever found to be affected with organic disease, or structural change, in the substance of the muscle itself. It still remains, then, to be inquired, whether a healthy, but unequally divided action of these symmetrical masses of red flesh, may not give an unsymmetrical form to the bones, (*e. g.* of the spine,) upon which they exert this unbalanced impulse. That such actions may produce a change, is evinced by the high right shoulder of ploughmen, a most healthy order of society, and whose bones are found to be of the firmest texture.* I have a case of lateral curvature before me, where the girl wore no corsets or other constraints of dress before she was fourteen years of age, lived till then in the country, and had full permission to roam about, almost at pleasure. This young person has a slight congenital,

* The reason why spinal curvature is thought not to exist in such persons, is, that, in them, the looseness and coarseness of their dress conceal it.

perhaps hereditary, deformity in the feet, to which circumstance I would entirely attribute the lateral curvature: for just as lateral curvature may produce a shuffling manner of walking, so a shuffling manner of walking may in time produce a lateral curvature. In like manner the advanced shoulder, and halting step of the ploughman are to be attributed to one foot being always in the furrow, and to the inequality of the soil on which he is accustomed to walk. Sailors have generally the spine bent *forwards*, a characteristic which Smollett has not neglected to bestow upon that *beau ideal* of a British seaman, Commodore Trunnion. This stoop or bend in the back is most remarkable in men who serve on board the larger vessels of the line, owing to these vessels consisting of several decks, the height between which is not sufficient to permit a man of the ordinary stature to stand upright. It is notorious that artisans generally contract some bend or twist in their back-bone or limbs, so characteristic as to enable a practised eye easily to judge of their respective pursuits,

without any other information than what is derived from their appearance. Clerks, and other sedentary persons, frequently contract the lateral, or twisted curvature. "I have seen," says Mr. Bamfield, "instances of *lateral curvature* produced by a habit of long continued inclination of the body to one side, after the adult age in insane persons; in the young and growing this is a more common event. Young artists of both sexes are liable to lateral curvature from this cause, from adopting a habit of sitting before their paintings and drawings, with an inclination of the body to the left side, with the left arm resting on the elbow, or hanging by the side, sometimes with the palette in the left hand, whilst the right arm and shoulder are raised, for the purpose of directing the pencil, and the head is directed to the left shoulder, and in this position the spine is kept in a state of lateral curvature for a long continuance of time." Dr. Harrison informs us that among the colliers of a particular mine in Lancashire, who are obliged,

from the thinness of the stratum, to sit in a bent posture, and to force their right side into the vein, while digging out the coal, the spines of all of them become, in process of time, curved towards the right side. This very influence of occupation is a proof that the primary causes of the deformity may *sometimes* be referred to the action of the muscles; for what is an occupation, but the performance of *a series of muscular actions*, directed towards the accomplishment of *a certain series of effects?* It is astonishing, indeed, to see the pertinacity with which some writers assert that the lateral curvature is never found except in females! some of them even add that it is always the product of constitutional disease! In fact, among the male aborigines of London, the practice of *giving* the wall by the left, and *taking* it by the right shoulder, which originated in their narrow crowded streets, something less than a hundred years ago,* has given an advance to the right shoulder, and an obliquity to the trunk, by which

* Boswell's Life of Johnson.

they are easily distinguished amongst other men, and which vain new-comers often awkwardly imitate, from an idea of these postures being fashionable.

Admitting, then, that unsymmetrical muscular action *may* produce this lateral deformity, it can hardly be the cause of its appearance in the numerous young ladies whose parents and teachers are at so much pains to preserve an uniformity in their mode of action; unless, indeed, imperceptible deviations from symmetrical action in these individuals be assisted by a favourable state of the levers themselves. The backbone, we have seen, is a pillar built up of twenty-four short cylindrical bones piled one upon another, and extended from the large solid bones that support the body when sitting erect, to the lowest part of the head.

The bodies of these vertebræ are separated one from the other by means of a strong elastic substance of considerable thickness,* and are girt all round by a powerful ligamentous band. This substance retains the two vertebræ, to

* Technically, intervertebral substance.

which it belongs, continually together, and though, strictly speaking, it prevents all immediate motion of one bone of the spine upon another, permits of most extensive motion of the whole column of bones taken conjointly, by means of the great elastic power of which it is possessed. To whichever side the body inclines, this substance readily yields, and returns in a moment to its proper position by a very powerful resilience, when the weight of the body and force of the muscular contraction cease to operate. As this substance is continually yielding under pressure during the day, a person of ordinary stature will often be found considerably taller in the morning than at night. In old age the body is shorter than in youth from the greater condensation of this substance, and its inclination forwards in persons advanced in years depends upon the yielding of this compressible substance to the weight of the superincumbent structure. Hence any undue inclination to either side, during life, if frequent, constant, or protracted, will cause a certain diminution in the thickness of this sub-

stance on the side to which the body inclines, accompanied by a proportionate rising of the same on the opposite side, and will in the course of time produce permanent distortion of the whole column of bones. This effect will be more easily produced during childhood, when the bones are in a state of growth, the ligaments more yielding, and the gristles and the intervertebral substance peculiarly soft. "A tumour on the head or jaw, which makes a child carry the head to one side, or constant stooping, such as is used by a girl in working at the tambour, or the carrying of a weakly child always on one arm by a negligent or awkward nurse, will cause in time a fixed and irremediable distortion."*

Each of the four and twenty cylinders, (also called *vertebræ*,) is a lever, whose *fulcrum*, or *support*, is the upper surface of the cylinder, or vertebra, upon which it rests.

The *moving power*, we have seen, is composed of various muscles inserted into the sides, and into the back of each vertebra. For these in-

* Charles Bell's Anatomy.

sertions there are parts, like handles, that jut out, and allow the muscles to take firm hold, and thus greatly increase the effect, or *purchase* of the muscles in moving the spine.

The *weight* which is to be raised by this cylindrical lever, differs in every one of the cylinders of the back. In the case of the first cylinder, or vertebra, the weight to be raised is merely that of the head. The second has to raise not only the head but also the first vertebra, which rests upon it, before it can move upon its point of support. The *third* must, in addition to the head, raise also the first and second vertebræ. The *fourth* the first, second, and third. The burden to be raised by these little levers, which, even with the intervening gristle, do not average an inch* in length, increases more and more as we descend. In compensation, however, the levers become longer, and the muscles more powerful, as the weight to be elevated increases. Besides the weight of the vertebral pile, or

* See Cloquet's Anatomy, by Knox, p. 23.

column, that is thus to be raised in addition to the head, that of the arms, and of the chest, must be lifted by the levers of the back and loins, at the same time. The levers of the neck have to raise, in addition to the head and to the vertebræ above them, the fleshy parts of the neck, which are of considerable weight.

This curious mechanism of the spine, divested of technicalities, may be comprehended with the greatest ease by the general reader. When he is told in addition, that the whole of the muscles, or red flesh, on the back, are made for keeping the spine erect, and for inclining it when necessary, to one side, that all the muscles on the fore-part of the body bend it forward, he has all the scientific knowledge that is indispensable to the study of its curvature.

Such being the apparatus, we must inquire, in a popular way, what are the circumstances that lead to its deformity in young females of a certain rank in society. But before instituting this inquiry it will be necessary

to say a few words on some other points of the subject, the chemical analysis, structure, and mode of growth of bone.

When put into dilute nitric acid, or *aqua-fortis*, bone soon *becomes gristle, though it retains the figure and dimensions it previously possessed.* A similar change takes place in the bones of those afflicted with that variety of rickets that attacks grown up persons. In both cases it is well known that this phenomenon depends on the removal of an earthy matter, named phosphate of lime, which may be obtained from all bones, by burning, the gristle being by this process burnt out, while the earthy matter is left. The bones of children contain scarcely any of this matter till a little before birth, and accordingly are very soft and flexible. As more earthy matter is added, the bones become harder, firmer, less flexible, and more easily broken.

This hardening of the bones goes on till the prime of life, at which time no trace of the gristle, the true mould of the bone, can be detected by the eye; and when there is, in

reality, twice as much earth as gristle in its substance.

But the rate of this addition to the substance of bone, is modified by various causes. The manner, in which it takes place, has been carefully ascertained by observation :—

A matter, of the consistence of jelly, is seen to form itself in the very middle of the flat gristle, the basis of the bone. In this matter numerous small *red* blood-vessels are next seen to form themselves. These vessels shoot out, in a little time, like rays from a centre, towards the edge or circumference of the bone. Lastly, on looking with a microscope, we can see that the earthy matter of which we have spoken begins to be laid down along the sides of these *red* blood-vessels, called arteries, forming like themselves rays emanating from a centre; and continues to be so deposited till the whole area of the bone is filled up. It is by this process that the flat bones are formed.

The long bones are formed in a somewhat different manner. They are first moulded, like the others, in gristle, whose fibres run lengthwise, and take exactly the form of the

future bone. When the earthy matter begins to be deposited, it is first to be observed along *red* arteries in the middle of the length of the bone; and with these arteries passes round the circumference till it has completely surrounded and embraced the gristle, so as to form a bony ring, called the *initial ring* of the future bone.

From this ring, vessels parallel one to another (and not radiating as in the case of the flat bones,) are seen to extend towards each extremity of the gristle; and to have deposited along their sides, in the same parallel direction, fibres of white earthy matter. In this manner are formed the shafts of long bones.

For the better articulation of these with the contiguous bones, a small bone, called the *overgrowth*, (or epiphysis, in technical language,) having a smooth articulating surface, is moulded in gristle at each end of the shaft of the bone, and is connected with it merely by gristle, till the fourteenth or sixteenth year. About this period the *shaft* and the overgrowths unite into *one* long, and perfect bone. These overgrowths may be easily seen in the bones of

veal, lamb, pullet, and other young animals which have been boiled; they are then easily separated by the hand. Their ossification, or conversion into bone, is similar to that of the flat bones, by radiations of fibres from a *nucleus* or centre.

The reader may now fully understand, that, *to the imparting proper hardness and solidity to bones, a due quantity of red arteries is indispensable.*

But *red* arteries are merely common arteries, carrying *red** blood:—therefore, *to the due consolidation of bone, a certain proper supply of red blood is necessary.*

Now, the supply of *red* blood and the formation of new vessels to carry it, will be most abundant when the activity of the circulation is greatest. Thus when we rub our hands or eyes, these organs, however pale before, assume a blushing redness, which, being ex-

* The blood, or that part of it, which circulates in the minute arteries, is *colourless*. When a part is inflamed or excited, the same vessels may be filled with *red* or coloured blood.

amined through a glass, or by a good unaided eye, is found to be produced by numberless small vessels, not previously visible. Blushing, proceeding from mental emotion, arises from a similar change in the blood-vessels. Abundance of the *red* vessels also, from which the earthy part of the bones comes, existing in all parts of healthy and vigorous young persons, and becoming most rapidly increased in them by any excitement, causes their bones, when fractured, easily to unite.

On the contrary, when the circulation is languid, rubbing does not easily redden either the hands or the eye; emotion less readily gives rise to the blush, and broken ends of bones unite slowly and with difficulty. Hence it follows, that, *whatever accelerates while it supports the vigour of the circulation, must promote the consolidation of bones*, by filling arteries with *red* blood, and promoting the growth of new arteries. Blood, deriving its colour from the red globules it contains, which are loaded with phosphate and carbonate of lime, the earthy components of bone, is thus

introduced into the part, and deposits the least soluble portion of its elements, so as to form true earthy bone. It follows, then, that unless a due supply of this necessary matter be afforded to the bones of the spine, every one of them will be so much nearer to the state of gristle than to that of rigid health, will be the more easily acted on in proportion as it is softer, will yield to the influence of long continued pressure on one side, and, as the ossific process is not yet complete, will allow of some deposition being made on the side left free from pressure, and thereby liable to be increased in length. This vitiating process will be aided by the facility with which the gristle, interposed between any two vertebræ, yields to the pressure of the upper. The state of deficiency in the consolidation of the vertebræ, which we have been investigating, results from our present system of female education. The perpetual restraint, under which a girl is kept from the first dawn of intellect, robs her of that exercise to which nature prompts, and fritters down, subdues, or destroys her emotions. Yet by

exercise alone can the voluntary muscles acquire vigour and power, and the circulation be properly balanced. The strength and bounding state of the pulse in a stout and healthy peasant may, almost, be deemed the effect of some awful disease of the heart, when compared with its feebleness in a delicate female. "The might that slumbers in a peasant's arm," equals what may be referred in the delicate girl to some tremendous excitation of the nervous system. Excitement, indeed, there is, in the former case—but such only as the bounty of nature hath, more or less, supplied for all—though the fashions of the times lead many to deny it to themselves and to their offspring. The action of the peasant's heart, yielding to the natural emotions of his soul, in the fulness of his vigour and his health, sends forth a current of well-prepared blood to nourish every fibre through which it bounds, and thus produces the Herculean symmetry that marks his manly form. In the accomplished lady, from a fashionable and sickly dread lest the form, losing its Corin-

thian delicacy, should become "*stumpy*" and "*stout;*" lest the reason and the passions, by once obtaining their natural sway, should render the mind decisive and unbending, every artifice is employed to avoid the fundamental causes of a vigorous circulation. She is stinted in her food, confined in her dress, and burdened with unprofitable occupation. Her desire for action is curbed by customs which she may not transgress, by authorities which she dares not disobey, and at which she dares not even express her dissatisfaction. A weak, and often a diseased, heart, a languid circulation, a pale, pinched face, and cold extremities with frequent chilblains, are the result, and the index, of the feeble powers by which the blood is moved, in the proverbially "puny boarding-school girl." How then can the curious deposition of earthy matter, on which the due consolidation of the bones depends, go on as it ought, under this deprivation of the vital force? This process demands a vigorous circulation, yet every possible means are taken to render the circulation weak; it is effected by

the vessels carrying *red* blood, yet ingenuity is exhausted in devising means to lessen their number, and to weaken their activity. The bones of the spine, consequently, in such young persons, never become firm, yield easily to the superincumbent weight aided, perhaps, by the force of the muscles, and thus, being disposed to grow unequally, impart to the spine a lateral inclination of longer or shorter duration. This inclination, before any structural change has taken place, may be said to be merely *temporary*, and is capable of being removed at pleasure, but, if the application of proper means of prevention be delayed beyond a certain period, will, as we have seen, soon become *permanent.*

Such is the cause generally predisposing the spine to become laterally curved. The unequal action of the muscles is the impelling power, and is denominated *the exciting cause of lateral curvature.* The *weight*, however, *of the head*, *upper extremities*, and *trunk*, evidently must add to the influence of the muscles in producing any deviation from

the perpendicular, in the vertebral column. The mischief does not end here: the general health is insidiously and gradually impaired, and, though not so much injured as to be considered in a state of absolute decline, is in that condition usually denominated *puny and delicate.* The natural functions not being discharged in a vigorous or perfect manner, the deformity proceeds, in such a state of the system, by slow and insensible degrees. At this period, however, the supervention of any acute complaint—such as fever, inflammation, or any of the eruptive diseases incidental to youth, which induce great debility—causes the progress of the curvature to become more rapid, at least until the strength of the patient be restored.

The cartilages, ligaments, and muscles, being supplied with nourishment from the same source as the bones, suffer equally from the same privation. The muscles become not only more languid and feeble than they ought to be, but are sooner exhausted. The indications of lassitude, necessarily from these causes, pervading

the general carriage of the child, being attributed by the teacher to indolence, is attempted to be combated by a rigorous enjoinment of some particular, generally the erect, posture. The suffering in consequence of this rigour soon becoming considerable, the child endeavours to render it tolerable by means of alternate efforts at *balancing.* A person seated upon a stool or chair, may throw the weight of the head, trunk, and upper extremities upon either of the hips, almost without any apparent deviation of the spine from the perpendicular. This is effected by drawing the spine to one side, and leaning the head and neck slightly to the other. I am persuaded that in this manner girls often rest themselves when writing, or when playing upon the piano and upon the harp, though they are thought to be sitting sufficiently upright. The right hand, being in all of these occupations that which requires most scope for motion, gives rise to the right shoulder being raised, and, in order to facilitate this, to the balance of the body being maintained on the *left* hip. The curva-

ture that arises from these habits, is thus directed to the *right* side. The whole animal system partakes more or less of the baneful influence resulting from these sources, but the spine more particularly ; since it is not only unable to partake to the fullest extent of the exercise and invigorating influence, limited as this may be, which the other parts of the body are permitted to enjoy, but is, as we have seen, exposed to a series of evils peculiar to itself, at a period when it is least capable of resisting their injurious tendency.

It is plain, therefore, that till the effects of natural emotion and of exercise are no longer dreaded, we must lay our account in meeting with delicate and twisted, or even curved spines. If, moreover, we consider the effect of thin dress, and of the use of linen, or of fine cotton, in place of flannel next to the skin, we shall find that the introduction of such kind of drapery into the chill, murky atmosphere of England, must go far to resist a generous circulation of the blood, and a correspondent compacting of the solids.

It is usual to allow the neck and breast to remain bare, in order to accustom the child to resist the vicissitudes and inclemencies of the seasons. The intention, though good, is not adapted to the variable climate of this country; and its adoption, the rest of the body being at the same time covered with warm clothing, renders the chest more susceptible of injury. Inflammatory diseases do unquestionably often arise from this exposure, which might be avoided even by a slight covering of muslin. Lentin, a celebrated German physician, as well as many of our own countrymen, is of opinion, that croup is, not unfrequently, thus produced.

On another evil, of the highest importance, resulting from the present system, one great cause indeed of the continuance of the mischief, I have hitherto withheld any remark. It has been shewn, that the bones may in early life become distorted from various causes. Now it has been inquired, and with some shew of reason, whether *the form thus produced may not be propagated in the progeny of such a parent?* A bent back, a wry neck, or

a high shoulder, has been known to run for many generations in the same families, though in them no other hereditary constitutional peculiarity or disease could be traced. Nor is it more difficult to conceive that the bones of the child may resemble those of the parent, than that the muscles and lineaments of the face, and the dispositions of the mind, may present an hereditary similarity.

This opinion has been attempted to be controverted by a frivolous and ill-founded argument: that, if defects of the person, not depending on constitutional disease, can be transmitted to offspring, we should daily hear of children being born without legs, arms, and fingers, of parents who have lost these members from accident or disease. But the cases are not parallel. In short, there is no similarity between defects which have *originally* been, or ultimately become constitutional, and those which, being accidental and local, do not affect the general vigour of the system. Besides, no one can deny that parents, whose peculiarities of form are known to be wholly independent of

constitutional disease, as those consisting of certain defects in the number of toes, fingers, or limbs, or redundancies of the same, very frequently transmit such peculiarities through several generations of their descendants.

In the bones, however, not only the form, but also the structure and degree of aggregation may be similar in parent and child. If, in the bones of a mother, during youth, the circulation has been languid, the consolidation slow and imperfect, or the form biassed by muscular action, it may reasonably be expected, at least under the present system of female education, that a tendency to these states of the bones will be developed in her children, although she may be entirely free from those frightful constitutional diseases, to which such a tendency is frequently ascribed. In a word, in the offspring of such a mother, the bones are frequently soft for the same reasons that the muscles are flabby, and that the features are similar to those of her parent.

If parents can still be found, so rational as willingly to forego the cultivation of a morbid

delicacy of appearance, either from the preference of sound health of mind and of body, or from an apprehension of the paleness, of the deformity, and of the imbecility, often concomitants, and generally results, of the state of the system, inducing such appearance, they will attend to the following simple principles, which, leaving their children sufficient time for elegant accomplishments, will confer on them the inestimable blessing of a healthy mind in a healthy body:—

1. Teachers and parents often seem to forget, that in the philosophy of education, doubling the power does not always double the effect. The *second* hour of study is seldom half so good as the *first*: the third is much worse than the *second*: there is, in fact, considerable truth in the remark of the child, that "it forgets in the fourth hour what it learnt in the first." The effective part of study, as well as of racing, decreases in proportion to their duration. Students, in university classes, find an hour sufficient time to devote exclusively to one subject. Their application, if incidentally pro-

longed, induces a disagreeable feeling of exhaustion. The same effect results when the attention is too long kept fixed by any public exhibition. It follows, then, that time is actually *lost*, when too long a period is devoted to study. The time thus wasted, if spent in recreation, is more than sufficient to allow of the mental powers being fully renovated by the period, at which, under ordinary circumstances, the jaded scholar begins to leave off study. Experience teaches us, besides, that nothing would be lost by this intervention of amusement, but that an actual accession would be made to the acuteness of the individual.

This mode of reasoning applies also to another very material point in the development of the physical powers—*the making too early a call upon the mental faculties.* It may fairly be questioned, whether scholastic tuition does not, in most instances, prove more injurious than beneficial to children before the attainment of the sixth year of their age. It may be argued, that many prodigies have astonished the world before the completion of

their fourth year. We do not indeed often find that the intellectual powers outstrip the growth of the body, but on the contrary increase in strength, as it increases in magnitude and vigour. From this correspondence between the powers of the mind and those of the body, it is highly probable that the brain and nervous system, the organs of thought and volition, are not prepared for continuous exertion of these functions at a very early age. The acquisition of the names of objects of sensation, appears the chief occupation of the mind in early life. In order, indeed, to acquire, and to retain the names of objects, the powers of comparison and of judgment must be employed. For it is alone, by ascertaining the agreement or disagreement of certain compared sensations, that we recognise those which are similar, and therefore known by the same names, and those which are dissimilar, and therefore known by different names. But the infant mind is seldom occupied, or capable of being occupied, by the numerous and more complicated relations of our sensations and ideas to one ano-

ther. It is then unnatural to the brain, at that period, to be much exercised for these purposes. Such exertions can only be effected by a more rapid supply of nutritive blood to the organs used. A supply of nutriment, however so afforded, not only drains the resources of the rest of the body, but often lays in the nutrified organs themselves the seeds of disease,* to be fostered by the first genial coincidence. It must, then, be better to make only such calls for exertion on the mental powers, as can be answered without destroying the balance of the circulation throughout the system. Previously, therefore, to the development of these powers, a child had far better be entrusted to the charge of a benevolent, well-informed superintendent, than to that of a tutor.

A particular talent manifesting itself at a very early period of life, may, in some instances, perhaps, be cultivated to a certain extent with

* As, of that inflammation of the brain terminating in effusion of serum, popularly known by the name of "water in the head."

impunity, as its culture may be presumed to be productive of healthful recreation, without being attended by too great mental exertion. To cut off the source of a delight so pure as that which thrills through the bosom of a parent while encouraging the early expansion of the intellect of his child, may appear to some harsh and unnecessary. But they ought ever to bear in mind, that what is unnatural is unlasting; and that they who foster the blossoms which are the precursors of spring, and not its products, gather little but disappointment. Though we read in mythology of the infancy of Hercules, and, in history, of the childhood of Bacon and of Johnson, the popular notion is not the less devoid of foundation, that generally—nay, almost universally—precocity is either the symptom or the cause of physical debility, not unfrequently stunting the natural growth, or producing deformity in after-life. We know that fruit, bearing many of the appearances of ripeness, is not unfrequently found to have been blighted; that a plant, by being forced, is generally deprived of its vi-

gour; and that women, in countries where they arrive prematurely at womanhood, are prematurely visited by old age. The number of persons who have realized any remarkable promise of their childhood, is singularly small; a fact for which it would not be difficult to suggest a reason, were this the place for such a discussion. I therefore wish to remind my readers, that if they urge too hastily the instruction of the mind, neglecting to lay a solid foundation for bodily health, they will probably deprive their children of both these blessings. The weak are certainly further weakened, and the strong are as certainly not further strengthened by the too early exertion of their faculties. In short, premature genius ought seldom to be encouraged, never to be sought for: the old saying is indeed too true—" there is but one wonderful child in the world, and every mother has it." To recur to the subject more immediately before us, accomplishments are dearly purchased at the expense of a distorted spine: the object is acquired, but the end is sacrificed.

I would, therefore, be understood to mean, that the general education of children should not commence earlier than in the sixth or in the seventh year, and will then be found, by the eighth or ninth, to have produced on the mind greater improvement than if it had been earlier commenced.

Children, when sent to school at a very early period, as they often are, "to be out of the way," should not be kept in the school-room longer than for an hour at a time: yet it is customary, even at day-schools, to keep them confined from eight or nine o'clock in the morning till two or three in the afternoon, without allowing them any interval for relaxation. Young children, in such cases, are often seen to sleep as they sit on the form. In the drowsy inattention which does not proceed absolutely into sleep, the weight of the head, and the position necessarily assumed by the body, owing to the spinal column being left to support itself, produce a powerful influence on the intervertebral substance, and lay the foundation of crooked spine. The child, if forcibly

kept awake, being exhausted and fatigued by the sameness and uninteresting nature of her occupation, sinks into attitudes calculated, if possible, to produce a more injurious result. Teachers in schools are so thoroughly aware of this progressive diminution in the power of the attention and of the memory from too long application to one subject, that they in general endeavour to avoid inducing it, by changing the object of study. Hence, in many fashionable seminaries, the same young person is often called upon to attend to eight or ten different teachers in the course of the day. The fatigue, undoubtedly, is by these means materially relieved; *but still, fatigue is produced;* as any one may experience, who studies long, however varied or agreeable may be the objects of his attention. Were such effects avoided by shortening the periods of study, by interposing frequent intervals of vigorous, agreeable, recreative exercise, the apprehension would be more acute, the conception more clear and distinct, and the memory more retentive. The robust health which would then paint the rosy

cheek and lighten up the laughing eye, would make the heart of the parent as glad as now it is anxious!

The recreations at present allowed to females are *monotonous*, *insipid*, and *heartless*.

They are *monotonous*, inasmuch as, being confined by the importance attached to certain principles or circumstances, they are generally so constituted as to demand but a limited exertion of force or of motion, and almost to obliterate motives of emulation, or the heart-stirring emotions of pride, anger, or shame. Even trifling rewards* should not be withheld, as a stimulus to exertion, unless it can be made to appear, that any human being was ever led to despise advantage, by their being left out in school games. "Repel nature as you will," said a great poet, "she will still recoil to her old position."—Neither man, nor animals of an inferior class,† can be amused by any kind of

* Adam Smith's Posthumous Essays.

† See in Magendie's Physiology (translated by Dr. Milligan) "the Theory of Attitudes," p. 164. This is a work which every teacher who undertakes to regulate the mechanical motions of young persons, should possess.

play, or of gambol, but such as involves an imitation of the actions of the adults of their species. The more we prohibit in these scenic representations of the future, the spirit and motive, which originate the plot and bustle of the afterpiece, the more cold and uninteresting do we render the performance. When the real game of life comes to be played, the selfish passions appear rather to have been suppressed, than obliterated, by a school education. It is a popular remark, indeed, that the youth of both sexes, so brought up, manifest a greater degree of egotism and selfishness than is observed in others. Recreations also, unnecessarily restricted by the hand and eye of the superintendent, become few in number, consist of few parts, and are constantly perverted from their natural connexion and *denouement*, lest these should offend some *great* general principle. In short, the poor girls, wearied out with study, are, during play-time, often teazed to death by the restrictions, or the absolute interference of the teacher, who, like Sancho Panza's doctor, *Pedro Recio*, deprives them of the anticipated

pleasure at the moment they are prepared for its enjoyment.

The recreations allowed to females, are for the same reasons, *insipid*. Girls, therefore, when left alone, often prefer singing or conversation, to exercises devoid of meaning, dignity, or interest. An ingenious person may do much to remove this evil, by inventing new games; but, unfortunately, they who are pragmatic in the observance of small rules, and of insignificant principles, rarely invent any thing. They content themselves with frittering down the inventions of others. The ideas of the school martinet extend not beyond the drill and the parade.

It is not less true that the amusements allowed to young females are *heartless*. They want an object, consequently want interest: they are without rewards, therefore are not calculated to excite ambition: they are superintended, therefore are rather exhibitions than recreations. There is gained then, no gladdening of the heart to relieve the wearied head:—the whole amusement scarcely amounts to more than a

change of labour. These and similar privations are ' lady like!' because all ladies are subjected to them. Thus is added the folly of fashion to the absurdity of systematic ignorance.

Let then the amusements and recreations of females be interesting and unconstrained; let them be of a nature to be hailed as so many interludes of delight; let them be various, mimetic of future life, and exclusive of none but boisterous, violent, vulgar, or ungraceful motions. Above all, shut out the superintendent, and we shall soon cease to hear of crooked backs, notwithstanding all the arts and sciences that are at present reckoned necessary to a polite female education, and which make so large a demand on the time of youth, in their acquisition.

No artificial means can be regarded as substitutes for active and judiciously guided exercise: this alone can preserve the frame of the body perfect in its symmetry. Young people have a natural propensity to activity. It is an ill-judged policy to curb, on every trifling occasion, the natural and buoyant spirit of young

females, as inconsistent with that delicacy and refinement which characterize the sex.—"It is to be hoped," observes a judicious modern writer,* in treating of the beneficial effects of exercise, "that the period is not far distant, when, amidst the many and real improvements in education, more attention will be paid to this important point. In every system of education, at female seminaries, as well as at boys' boarding schools, a plan of *regular* and active exercises should form an essential part; the want of exercise not only leads to general feebleness of the frame, and of the mind, but it frequently sadly interferes with the growth and development of the form." Females, then, as well as boys, should not be kept in confinement during so many consecutive hours, as is the practice in most modern seminaries. *The intervals for play or relaxation, if not somewhat more prolonged, should be of more frequent recurrence.* Girls, in particular, should be encouraged to engage earnestly and with spirit in such games of exercise and skill, as are the most likely to

* Dr. Marshall Hall, on diseases of female youth.

prove beneficial in developing the form of the body. To this end* an occasional walk, or ride in a carriage, under the eye of the governess is not sufficient, and is in fact little more than an apology for exercise. The latter, indeed, being an exercise passive in its nature, is calculated for convalescents, rather than for children in full health and vigour. Bodily exertion, unless combined with mental amusement and exhilaration, produces comparatively little beneficial influence in the development, or even in the maintenance of the physical powers. On this account we cannot but approve highly of the plan of education adopted and extensively practised, by the amiable and intelligent, but unfortunate, Pestalozzi.† In the conception of his system

* When young ladies are educated at home, horse exercise is in general very desirable where it can be attained. It must not, however, be denied that the propriety of this kind of exercise for delicate females, in whom there exists any tendency to distortion of the spine, has been questioned; since, from the awkward position in which it obliges them to sit on the saddle, a disposition to curvature is apt to be induced. (Benj. Bell, on the bones.)

† At Mr. Fellenberg's establishment of Hofwyl, near

every application of the powers of the matured, being applied to elicit the energy and better propensities of the infant mind, leads the teacher in a familiar and friendly manner, gradually to introduce into the mind of the pupil not only a desire of knowledge, and of emulation in the acquisition of the same, but, under the idea of copying the master, a care about the personal appearance and carriage, and a willingness to enter, heart and soul, with him into such games or exercises, as he, their companion as well as teacher, may propose.

The arrangements for walking, generally speaking, are very faulty even at the best boarding schools. Every one of these establishments, should, if possible, be "a little farm,"* over which the scholars ought to have

Berne, a similar system is pursued; the superior results of which, compared with those of the ordinary modes of instruction, are a theme of admiration throughout Switzerland.

* A beautiful exposition of this idea is to be found in the Spectacle de la Nature of the Abbe Pluche.

full freedom of ranging. Towns are quite improper for such institutions: but since many able and genteel persons, whom no advantage could induce to reside in the country, can be prevailed on to take charge of young persons in towns, where alone we can expect to meet with masters of talent and celebrity, and where individual character can be generally much more truly appreciated, the natural advantages in favour of the country are perhaps more than counterbalanced. On the other hand, town teachers ought to exercise their pupils more, in proportion as the play-ground and situation is less salubrious than such as might be obtained in the country. As the games and amusements of children are imitations of those of after-life, and may be compared to the labours and pursuits of adults, so these walks should always be expeditions for the attainment of some object. They should be more extensive than those in the country, provided the population of the town be not so crowded as to render long walks unattainable. To remedy this evil,

boarding schools should be situated in a square, having a green inclosure, to which all the residents may have access. Within this, covered walks may be prepared, or awnings erected, in order that neither sun nor rain may prevent exercise. In wet weather, when the school is situated at some distance, the young ladies may be conveyed in carriages to the square. Visionary as this suggestion may appear, I doubt whether the expense incurred by adopting it, would on the whole exceed that which is now contracted in consequence of the attendance of the doctor, to remedy the evils induced by want of due exercise. Mental exertion and corporeal discipline are daily persevered in, whatever may be the state of the weather: relaxation, therefore, being equally necessary, should not, if possible, be suspended on any consideration whatever. The frame would, by this practice, acquire solidity, the mind vigour, and the thousand miseries to which both are exposed at present from vicissitudes in the state of the atmosphere, would be avoided.

Lastly, much may be done to shorten the labour by facilitating the means of acquirement. This may be effected in several ways:—

a. By a judicious choice of elementary books, by avoiding all those that perplex instead of informing, and all that are below the average intellect of the age of the person taught.

b. By selecting teachers according to their merits. Fashion cannot, but an intelligent and honest friend may assist in the selection of a good teacher. If the teachers of boarding-schools were to be invited to mix more in general society, their talents and temper would become as well known as those of the curate and of the schoolmaster. Our present system makes nuns of them, drives them for confidants to persons of the same, or of a lower rank than themselves, and thus degrades the very class which it is our especial interest to elevate. We should at least exert towards them that friendly condescension, which we admire so much in others, whereby

we may gain an opportunity of knowing what we have to expect from their talents and principles.

c. Let the methods of study pursued in the seminary be strictly examined, before the young lady be entered as a scholar. In general, the errors in method, of the teacher, may thus be discovered.

d. There should be a class of young persons pretty nearly of the same age and acquirements as our pupil, in the school in which it is proposed she shall be placed. Inequality in this respect serves only to engender infantile habits, or absolute despair.

e. Great advantage may be gained by adapting the education in some measure, to the future prospects of the individual. At present all ladies attempt to write, as much as possible, in the same style; a sameness which is often matter of ridicule with the other sex. All, indeed, aim at the same acquirements, however various their future life is destined to be. How much better would it be to devote more time to the study

of the more *useful* arts and sciences, and to adopt a liberal use of recreation, and exercise, instead of spending so many hours in the acquisition of accomplishments, which are literally and for ever useless.

Though thus eager in the recommendation of a more efficient allowance of exercise and recreation than is provided by the present code of female education, I have already stated that violent, vulgar, or ungraceful movements, make no part of that addition to them, which I hold indispensable to the prevention of the occurrence of spinal disease. We have the high authority of Lord Bacon* for the fact, that *violent* exercise shortens the duration of life in men, and that the use of *moderate* exercise, whilst "it renders the substance of the body more solid and compact, and therefore less apt to be *consumed*,† may be one reason why women live longer than men." But independently of lon-

* Inst. Magn., Part III.

† He means absorbed. See Inst. Magn., Part III.

gevity, a degree of health, adequate for the moderate employments of female life is attainable by due recreation, without the smallest approach to violent exercise.

Vulgar exercises lead to vulgar associations, and, it being an easy thing to invent or to impart those that are not so, are very properly superseded, in all well conducted seminaries.

Ungraceful, are in reality vulgar motions, and proceed from a too faithful imitation of an improper original. They are scarcely ever seen in the savage. Sir Walter Scott's "Concealed gentleman,"* who was recognized by the old woman from having an eye like a gled, and a step like that of a '*highland* piper'—the North American Indians—the natives of Navigator's Isles described by La Perouse—all evince the gracefulness of the natural motions of the body when man is unsubdued by labour, and unbroken in spirit. In short, a movement, to be graceful must be natural, for all constraint produces the appearance of awkward-

* Tales of Canongate.

ness. Our organs of motion are, indeed, formed with an admirable aptness to move in the line, or curve of beauty. How much more easily do we dash upon paper with our pen, than draw a straight line, or a just circle! The one may be performed in the dark—in an instant—the other, to most persons, after years of labour and effort, is impossible.

Moreover, should distortion be already commenced, more harm than good is to be anticipated from vehement exertion: for violent exercise, by increasing too suddenly the circulation, accelerates the consolidation of the bones, now in an unnatural position, the more as it increases the appetite, and consequently the deposit of earthy matter in the bones. During the existence of such excitement, absorption is, for a time, impeded.* That interstitial† modelling absorption, which usually restores the natural form, under the stimulus of mus-

* See Magendie's Physiology, 3d ed., p. 356.

† The absorption by which the various parts of the body are reduced to their natural and just form.

cular pressure, being exceeded by the increased interstitial deposition, the deformity increases, or, at least, remains stationary. Restitution to the natural figure and position, can take place only when the absorption exceeds the deposition. Exercise, however, is not beneficial in preventing or removing every kind of deformity, in some cases, on the contrary, is injurious, and is in all detrimental, unless confined within due limits, and of a kind adapted to the peculiar circumstances of the individual case.

Well regulated exercises then are desirable. Such are the Calisthenics. When first introduced into this country, these were of much too athletic and violent a kind, but through judgment and experience, are now reduced to a series of graceful, dignified, and natural movements, admirably adapted to promote an equable development of the physical powers, and to call into action, in regular succession, every part of the muscular system.* In the prevention of defor-

* The system of Miss Marian Mason, whose attention has been particularly directed to this pursuit, and who, under peculiar advantages, has studied the nature of

mity these exercises, properly conducted, are invaluable, and by their influence on the general health, through the medium of the muscular system, have, in numerous instances, alone remedied the evil.

It may here be proper to enquire into the merits of *dancing*, and of the use of *dumb-bells*.

Dancing, as it combines the advantages of exercise with those of agreeable and exhilarating recreation, is highly to be commended. When taught by a person who understands the principles of the science in a physical point of view, it may prove eminently beneficial in favouring a

such exercises in a scientific manner, is well worthy of attention. She has selected from the gymnastic exercises of Clias, all those that are not of too athletic and indecorous a nature, and to these has added many of a judicious and graceful kind.

It is truly ludicrous to see with what arrogant presumption certain individuals, who have a particular end to serve, and whose interests are likely to be injured by a general approval of these exercises, endeavour to identify the graceful movements they are calculated to impart with the contortions and grimaces of mountebanks and umblers.

symmetrical development of the frame. In this exercise, for reasons that will presently appear more obvious, the erect, or any other fixed and irksome attitude, though often insisted upon by teachers, should not be enforced beyond the commencement of fatigue, but immediately changed for a state of perfect relaxation, more especially of the muscles of the spine. The arms ought to be used as much as possible, in order that they may be developed equally with the lower parts of the body. With this view, as the motions of the arms are not necessary to all kinds of dancing, some teachers are in the habit of requiring the performance of certain Calisthenic exercises, previous to the commencement of the ordinary lesson. Dancing practised to excess, is very apt to injure the finer proportions of the limbs, by developing too fully certain of their parts more particularly called into action. Thus, in our best opera dancers, the ankle and calf of the leg are often clumsy and Herculean, compared with the slender, skinny arms of such persons. Professional dancers, moreover, are seldom remarkable for

grace in any of the ordinary movements of life. In the performance of these they are generally constrained, formal, and automatic. The bad effects on the form of the foot, resulting from the force with which it is extended, gradually stretching its ligaments beyond the point whence, even if possessed of more elasticity than they are, they can return, are well known. Very few opera dancers can boast of a good instep off the stage. When the foot is placed on the ground, the arch of the instep yields to the weight of the body, and allows the concave part of the sole to rest on the same plane with the toes. When, therefore, these persons walk, they never rise on the toe, nor bend the foot. From their habit of turning the toes very much outwards, they acquire a peculiar mode of walking, usually denominated "a strut," by some "shailing," a term more properly applied to walking sideways.

These observations apply to the bad tendency of dancing practised to excess, and are intended to point out how questionable is the propriety of devoting much time to this accomplishment,

with a view to the attainment of more than graceful and natural habits of motion.

Dumb-bells.—The exercise of the dumb-bells forms, perhaps, a portion of school discipline in every seminary for the instruction of young ladies. The dumb-bells ought to be used regularly once or twice a day, for the continuous space of five or ten minutes. They should not weigh more than from three to four pounds each, for children from six to ten, and from four to six pounds for those from ten to fifteen years of age. Every school ought to be furnished with several pairs of these bells, varying in weight. An explanation of the proper mode of performing an exercise so common, however superfluous it may appear, is by no means unnecessary. I have witnessed girls, who have been taught the mode of using the bells at school, handle them in a very injurious and improper manner. I have seen them while swinging these weights backwards and forwards, poke out the head and neck at each alternate movement of the body in a manner calculated to render the exercise worse than useless.

The young person wishing to use the bells with advantage, must stand perfectly erect, place the heels together, and point the toes slightly outwards. The bells being grasped one in each hand, must be raised simultaneously towards the front and centre of the chest, and approximated, so that the corresponding balls of each bell may touch each other respectively. The bells are now to be moved straight forwards, *but not forcibly*, to the full length of the arm, and, with the arms kept extended, allowed to drop with sufficient force to swing them gracefully round the body. The arms must be gently turned out in their course downwards, so as to make the balls on the *outer* or *thumb* side of each hand approximate or strike against each other behind the back, the elbow joint being kept as straight as possible. The bells are then to be again brought slowly round to the front and centre of the chest, and to be moved in the same manner for twenty, thirty, or any number of times that may be deemed necessary.

The usual fault in the mode of using the

dumb-bells consists, either in *not turning* the arms outwards, as they are swung round the body, or in twisting them *inwards*. The fault in either case causes the child to elevate the shoulders in endeavouring to make the balls strike each other behind the back, and at the same time to thrust forwards the head and neck, and otherwise defeat the purpose for which the exercise is designed.

The weights may also be gradually raised at the full length of the arm from the sides, till such time as they are brought into contact above the head; then, the hands being turned outwards, allowed to fall slowly and steadily backwards, until the back of the hands meet, as in the former case. This mode of using the bells being more difficult, as requiring greater muscular exertion, is more peculiarly adapted for boys: yet with slight modifications, may also be advantageously adopted by girls, in whom there is any decided evidence of inclination of the spine to either side. In such cases, the weight of the bells should be from one-fourth to one-third less than in those, in which they are employed in the manner first recommended.

Used in either of these manners, the dumb-bells are found a most efficient means of calling into salutary action all the muscles of the system. By their influence the chest is gradually and equally expanded, the shoulder bones are properly depressed and drawn towards the spine, and the symmetry of the back is otherwise improved in a remarkable manner.

At first some difficulty and considerable bodily fatigue being experienced in using the dumb-bells according to the above rules, the exercise should not be persisted in longer than for one or two minutes at a time. After a lapse of eight or ten days, the period at each successive trial being increased, the exertion may be prolonged for ten or fifteen minutes, without being productive of any injurious fatigue.

This exercise should not be engaged in immediately after a meal, nor by children in whom the lungs are delicate, and who exhibit a marked tendency to consumption, because, by it the organs devoted to breathing are actively called into play, and may in such cases be materially injured.* In schools the discipline of the dumb-

* The contrary is the popular opinion.

bells should always be conducted under the eye of the governess, when practicable, before breakfast in a morning, and in an evening half an hour before going to bed, the two most desirable periods of the day for the exercise.

Other exercises beneficial in their tendency, as walking on a rope not elevated more than fifteen or twenty inches above the ground, balancing such bodies of little weight, as a work basket, pincushion, small bag of sand, and the like upon the head, or a rod in each hand alternately, may be advantageously adopted as a part of school discipline for the prevention of this kind of deformity. These and similar amusements being achievable only by an equal exertion of the muscles, at the same time that they tend to strengthen these organs, tend also to correct as well as prevent any deviation from the naturally erect form.

It has been already remarked that the poising muscles, when over exerted, that is, when contracted beyond the usual or habitual period, become exhausted and incapable of again obeying the dictates of the will, until such time as, dur-

ing repose, they have received a new supply of nervous or vital energy. In this manner constrained positions operate on certain of the muscles of the back and of the neck, and produce the sensation of failing or sinking, generally urged by females as a plea for making use of artificial means of support. Young ladies at most seminaries are compelled to sit at all times erect, with the view of overcoming or of preventing the acquisition of the habit of stooping. However efficacious the exertion of the authority of the governess, teacher, or schoolmistress may prove in this respect, there is no doubt that its indiscriminate employment has often ruined the fondest hope of the parent. The observance of such a posture for several hours in spite of fatigue, though aided by a *perpendicular backed chair*, must lay the foundation of a bad temper and of a crooked back. The very nature of this chair, the seat of which is too small, and the legs so long as not to allow the feet of the child to reach the ground, defeats the object it is intended to aid, gives rise to fatiguing, debi-

litating action of the muscles of the back designed to support the body and the head, and, consequently, insidiously aids in giving too great power to the opposite set of muscles. All muscles indeed, when enfeebled by exertion, require an interval for relaxation, in order that they may receive a new supply of energy, and are, during this interval, incapacitated for performing, accurately at least, their accustomed offices. If then the chair be still employed to aid the fatigued girl in performing her task, it causes other muscles not adapted, except as occasional accessories, to keep the body in the erect position, to be called into action, and thence the spine to deviate from its natural direction, slightly at first, but finally to such an extent as to make it betray its want of symmetry, even to the most indifferent observer.

But these, and equally valid objections to the use of the straight backed chair are usually met by the assertion, "Sir Astley Cooper approves of it." The authority of so eminent an individual is doubtless entitled to the highest consideration. I venture to affirm however, that

Sir Astley does not sanction the employment of this chair for hours, without allowing the child, for the purpose of relaxation, to select a more easy attitude, a practice pursued during school hours at almost every seminary in town. The seat, moreover, of this chair is always made unnecessarily and injuriously small, and placed at such a height as to deprive the body of the support which would be imparted to it, by the feet being allowed to rest upon the ground, or upon a moveable frame attached to the legs of the chair, at any convenient point. In sitting upright, the knees should be more or less bent, but never beyond a right angle, and the feet should be supported. If, the seat of the chair being too narrow, the legs be allowed to hang down, or be not supported for nearly two-thirds of the length of the thigh, they drag down proportionately the lower part of the body; an effect, the fatiguing influence of which is experienced more particularly in the loins. There is at the same time a muscular effort to draw up the legs, in order to prevent their weight from dragging the person off the seat, which,

combined with the constraint produced in the upper part of the body, by the effort to maintain the erect position, tends to twist the spine, and is an additional cause of deformity. But if the thighs be bent to a right angle on the body, and the legs be similarly inflected on the thighs at the knee joints, the feet being supported, then the base on which the body rests is square. In this case, each part supporting its own weight, no dragging nor fatiguing muscular action is induced; but perfect rest is obtained. On the contrary, when the legs hang down during a long-continued sitting, and the thighs have not a sufficient support, the latter acquire a crooked form. Hufeland asserts, that he has seen deformity of the limbs produced in the children of several families from a similar cause.

That muscles are absolutely exhausted, and temporarily deprived of their power by long-continued exertion, may be rendered apparent by a simple experiment. Any person who extends his arm or leg in a given direction, and endeavours to retain it in the position se-

lected for the short space of five or ten minutes, will soon experience a very painful sensation, and certain involuntary twitchings or jerkings of the limb, the muscles of which are thus being more than ordinarily called into play. In spite, however, of the striking evidence derived from this experiment, of the impropriety of compelling girls, however delicate, to retain for hours together in a state of undue action the muscles of the back and of the neck, the modern system of physical education requires such discipline. Most teachers being ignorant, unfortunately, of the principles upon which this system can prove beneficial or the contrary, from zeal for the improvement of their pupils, carry it to excess. The variety in the physical powers of the children is not allowed to have its due weight: all are subjected equally to the same system. The stronger, perhaps, may be improved; but, the weaker and more delicate girls must suffer in proportion to their incapability of withstanding its influence.

That discipline of this nature is extremely

fatiguing, and productive of great uneasiness both in the loins and in the upper part of the back, between the shoulders, is matter of experience and of very just complaint with every young lady, who has unfortunately been condemned to the empirical use of this straight-backed chair. *A sitting posture, it should be remembered, does not necessarily relieve or give rest to the muscles supporting the head and body.* An unconstrained, easy, semi-recumbent, or perfectly supine posture, can alone accomplish this desirable object. Whenever, therefore, the child or young person complains of being distressed or wearied by the erect position, she should immediately be allowed to select a reclining, or such other easy posture as nature may dictate. An unrelenting enforcement of the upright position, will, undoubtedly, defeat its own object, and expose its victim to the hazard of inveterate deformity.

Young ladies, instead of being compelled to make use of forms or perpendicular backed seats, during school-hours, with a view to the

improvement of the person, may be allowed to sit on chairs made with a *reclining* back, and stuffed tolerably hard with horse-hair. When there is any tendency to deformity, the back of the chair may be stuffed so as to fit the natural curves of the spine, but it does not require to be formed with this accuracy when used as a means of prevention. Chairs of the above description, constructed somewhat upon the plan of that employed by the dentist, have long been used as easy chairs for elderly persons. By the aid of a hinge, the back takes any degree of inclination that may be thought desirable. The girl, when fatigued during school-hours by the erect, may subsequently be allowed to assume the reclining posture,* without altering much the relative position of the parts of the spinal column, and thus to relieve

* It is quite a modern notion that the act of resting during the day in a recumbent posture, proceeds necessarily from indolence. We know, that amongst the ancients, a somewhat similar position was usually adopted during meals, probably from some reason founded on a knowledge of its beneficial tendency in the development of the form.

the muscles which poise the body, without, at the same time, hazarding the symmetry of the form by allowing it to fall into an injurious or ungraceful attitude. When by such means rest has been obtained, the erect posture may be resumed. Similar alternations of exertion and rest may be made with advantage at intervals during the day, without disturbing a proper and judicious course of mental cultivation.

The *inclined plane*, by no means a new invention, has of late years been very much employed in fashionable seminaries for the purpose of *preventing* deformity, and recommended by the medical profession as a means of *cure*. But, in regard to its employment as a part of school-discipline, the principles, on which it can prove serviceable, are in general either not understood, or not attended to. I have been informed by many ladies, who were in the habit, whilst at school, of using daily the inclined plane, that the employment of it proved worse than useless, and did not appear to prevent curvature from taking place, but in many instances to render those, who were already crooked,

considerably more deformed. Upon more minute inquiry, however, it became evident, that what they considered to be the use, is an abuse of the means. They were accustomed to lie extended, half suspended by a strap passed under the chin, on a broad, flat, inclined board, for a definite length of time every day, generally immediately after breakfast, whether urged from fatigue or not, in fact before they could have had any opportunity of becoming fatigued. During the succeeding part of the day, they were subjected to the accustomed discipline in the manner above described. Such a practice, being a mere form, is necessarily unattended by the slightest advantage. Some of those even, who have employed the plane as a *mode of cure*, and who have therefore used it more sedulously, retaining the horizontal posture for months almost without intermission in accordance with the rules prescribed by the introducers of the system, have informed me that upon the plan being discontinued, the debility of the whole muscles of the body, consequent on the want of exercise, and on the injury sus-

tained by the general health, soon rendered the deformity fully as much, if not more apparent, than it had previously been. But in these instances, attention to what may be termed *passive* exercise, (friction and similar modes of exciting the circulation,) had been neglected.

When used as a *preventive* of deformity, the plane is intended to afford a convenient and systematic mode of relieving exhaustion of the muscles of the back, and of the neck in delicate females, without obliging them to seek ease by throwing into contraction such as tend to produce an unseemly, or injurious position; an end which it accomplishes in a very complete and effectual manner. To use it when rest is not required, is productive of little, or no advantage.

Other practices adopted for the *prevention* of deformity are, the use of *back-boards*, of *back-braces*, of *collars*, and of the *suspended weight*. On each of these it may be necessary to offer a few remarks. As the observations contained in Mr. Shaw's second series of illustrations embrace all that need be said in expla-

nation of the erroneous principle on which the application of these ordinary means is in general founded, no apology for availing myself of them is requisite.

If the shoulders be braced by means of straps to a plate of iron placed on the back, it is evident that the action of the muscles, with which nature has endowed the body for the express purpose of holding the shoulders in a graceful position, will be superseded, and in accordance with the general law before enlarged upon, will, from want of due use, become proportionately incapable of performing their wonted office when the strap is removed. The muscles on the fore-part of the chest, whose actions are destined as an equalizing and antagonist power, will, from being excited to resist the force exerted by the straps, become increased in strength. When the use of the straps is discontinued, the shoulders will not only be returned to the position, which they held previously to the application of the plate, but be further drawn forwards by the power gained by the muscles on the fore part of the

chest, while opposing the action of the straps. No constraining force, then, should be employed with a view to keep the shoulders back. Machines of every description for the *prevention* of deformity, or for the cure of bad habits should be avoided. They are at best very inefficient substitutes for the means provided by nature. In young persons, in whom we may wish to correct round shoulders or a habit of stooping, we can obtain our object, and at the same time improve the general health and strength more by a superintendence of their exercises and amusements, so as to make a moderate demand for muscular exertion on particular parts of the body, as on the muscles of the back and of the neck, and on those between the shoulders, than by the use of back-boards, of collars, or of any kind of mechanical contrivance. The dumb-bells used in the manner described at page 103, the Spanish Exercise one of the most beautiful of the Calisthenic, skipping backward with the arms extended at full length, and the game *La Grace*, are calculated to call these muscles into salutary action.

When, however, the shoulders are very round, and the chest is remarkably narrow, a distorted state of the spine and of the ribs may exist, that may rather be increased than diminished by such exertions.

To correct the habit of stooping, it is customary, in some schools, to keep the head upright by means of a ribbon passed round the forehead, and fastened to the iron plate of the backstrap, or attached to a weight allowed to drop down along the back. This apparatus, while worn, causes the figure to look straight, though stiff and constrained, but the moment it is removed, leaves the head and shoulders to fall more forwards than before its application. As long as the head is forcibly held back by this means, the muscles in the back part of the neck, are in a comparatively quiescent or passive state, while those on the fore part of the neck are necessarily brought into a more than ordinary degree of action, in order to prevent the head from being pulled too far back. If the ribbon by which the weight is suspended behind the back be sud-

denly cut through, without the knowledge of the wearer, the head is immediately nodded forwards; from whence we infer that the muscles on the fore part of the neck were those by which the head was enabled to support the weight, and that the muscles on the back part of the neck, those in fault, instead of acquiring power by the remedy employed, were actually, from their action being superseded, deprived, to a certain extent, of that which they naturally possess. When a weight is employed to correct stooping, it should be suspended in front of the body by means of a strap, supported on the back part of the neck. It will then call into a contraction, tending to prevent the body being pulled forwards, the muscles at the back part of the neck and those between the shoulders. Thus, we observe that pedlars and other persons who carry before them, by means of a strap passed round the neck, weights, as baskets and the like, are generally very upright, and broad-chested, but that persons, habituated to carry on the back burdens supported in part by means of a band passed

round the forehead, as porters, and the fish-women of Scotland, are round-shouldered, narrow-chested, and very much bent forwards.

In connexion with the present inquiry it may be well to take into consideration the various modes of punishment adopted in schools. Girls, as well from their sex as from their natural delicacy, cannot be chastised in the same manner as boys. The infliction, however, of corporeal pain, though not expedient in seminaries for young ladies, is infinitely preferable to many of the modes of punishment common in these establishments. The practice of withholding food from children for several hours in succession until they may have performed the allotted task, though highly reprehensible, is more or less resorted to in every school. The effect of this practice upon a child of a delicate constitution, when carried to such an extent as to produce faintness from a want of the regular supply of the stimulus necessary to existence, proves highly detrimental to the physical powers, and may, if frequently repeated, lay the foundation of tedious and exhausting disease.

Confining a child during play hours, is a mode of chastisement which should be avoided. When, besides being starved and confined, the child is compelled to *stand* for several successive hours, until the task be accomplished, and to hold, perhaps, at the same time, at intervals, a book or other weight, in one hand, at arm's length, how can we expect that a delicate female, exposed to such a complication of causes calculated to produce distortion, can escape the evil. The indirectly injurious influence of the stocks used for a punishment, is, in many instances, greater than commonly imagined, particularly if the attitude insisted upon in their use be rigorously persevered in for a length of time. I need do no more than hint at the lamentable effects, known to have been occasionally exerted through the mind on the physical system of superstitious and timid children, by confining them alone in dark rooms. The evil tendencies of the various injudicious modes of punishment, common in every seminary, afford a subject well deserving of consideration, but, in detail, incompatible with the

object of this essay. My intention, in alluding even cursorily to the subject, is to excite teachers to make a scientific enquiry into the probable effects of every part of school discipline, in a physical point of view.*

There are, moreover, many other customs not yet mentioned, calculated to impart a tendency to deformity of the spine. Some of these refer to a much earlier period of life than that which we have hitherto been considering: others do not apply to any particular age. The habit which many nurses fall into of always carrying the child upon the same arm, may give rise to deformity. The side of the child, which is at liberty, being more exercised than the other, acquires a degree of development destructive of the natural equilibrium of the physical powers on each side of the body. This habit may also prove detrimental to the nurse, who may become "side-bent," or crooked, at the same time that her charge is suffering

* Some very excellent observations on punishments may be found in the first volume of "Practical Education," by Maria and R. L. Edgeworth.

in the back and limbs. Infants should not be made to sit *erect*,* from the first week of their existence. At a much later period of life, even, the spine is unable of itself to support the head and other parts attached to it, and at the same time to retain the *erect* posture.

The injurious tendency of the errors in nursing, just noticed, though it has been insisted on by many writers on the physical management of children, does not appear often to operate to the extent usually asserted. Deformity, of the kind under consideration, very rarely manifests itself before the child has attained the seventh or eighth year of age. From this period to the fifteenth year, the highest degree of excitability of the nervous system exists. During this interval the confinement of children, in the prosecution of their studies, is, perhaps, the greatest in proportion to their physical capability,—constitutional disease, natural debility, and the acute complaints incidental to early life, are most apt to proclaim themselves,

* Struve.

—the external agents, considered by far the most powerful in their injurious tendency, are in the fullest degree of operation,—and, the bones of the spine, retarded unduly in their consolidation, as we have seen, by our pernicious school system, are urged by the greatest degree of weight.

The *effect* of another habit, or, more properly, of a luxury, noticed by most writers on the subject of early discipline, has been, in some degree, overrated. The habitual use of a feather bed, or of a soft mattress, it is maintained,* may materially influence the development of the form. Such a couch, by the luxury and comfort it affords, fosters a disposition to indolence; by the undue warmth it generates, enervates the system; and by the position it imparts to the body, especially if the head be much raised, may favour the formation of deformity of the back, in children constitutionally predisposed to disease of the bones. The most desirable couch during childhood, is a mattress stuffed with hair, bran, or dried moss.

* Struve.

On this the body may enjoy refreshing and invigorating repose, without being exposed to the hazard of any of the evils just enumerated.

Children, who sleep two in one bed, contract a habit of always lying on the same side of the body, which is calculated to favour the production of crooked spine. Similar bad effects result from sitting much in one posture, as persons are apt to do who sit always on the same side of the fire, or in the same direction with respect to the light. These habits induce their victims to lean to one side, and to retain the body in that position, until nature, by moulding the bones into new forms, renders them unable to recover their natural condition. From a knowledge of this fact, we are led to deprecate the practice, common in most schools, of assigning to each scholar a particular seat, or a seat in a particular spot in the school-room. The seats should be common to all, and occupied by all in succession. To the practice, also, of compelling the class to stand, while the children are repeating the lesson of the day, may often be traced pernicious results. Boys, when obliged

to stand during a length of time for this purpose, are very apt to relieve the muscles that maintain the body erect, by balancing themselves on one leg, generally on the left. Girls, from the confinement occasioned by their dress, being often prevented from bending the body, so as to balance it on one leg sufficiently to afford relief, attempt to maintain their equilibrium by passing the left hand round the back, and by drawing down the right elbow.* Although it is undoubtedly proper that a child should be allowed to vary her position at will when fatigued; yet, as formerly observed, she should not be permitted to habituate herself to the selection of an injurious or ungraceful attitude. To avoid the consequences, we have been enumerating, the class may be allowed to sit whilst repeating the lesson, and each girl to rise in turn when repeating her part. The body, whilst in motion, can be maintained erect for hours at a time, without the person experiencing inconvenience:—to stand upright and motionless, even for the space of fifteen minutes, is productive of great fatigue.

* Shaw.

Lastly, there is a temporary curvature of the spine, denominated *sympathetic*, which arises from certain states of the system, and which, by the unsuspecting or the ignorant, may be easily mistaken for actual distortion. Owing to such mistakes, girls have occasionally been confined for months to a horizontal posture, before the spine has been discovered to be only affected *sympathetically*, by hysteria, or by disordered bowels. The detection of the true nature of such a case is rendered difficult, from hysteria and disordered bowels being almost always concomitants of that state into which the whole system is thrown, during the formation, or actual existence of permanent obliquity of the spine, and is only to be accomplished by careful investigation on the part of the medical attendant.

Such then is a general, and, I trust, sufficiently intelligible, exposition of the manner in which certain parts of the system of education, at present so extensively adopted in

this country, may prove prejudicial to health, or influential in the production of the most common variety of deformity of the spine. Undeterred alike by the prejudices, behind which many may entrench themselves, as by the philosophic indifference, which many may assume, I have boldly, in some instances, perhaps, pragmatically, advanced my opinions. On this subject with the prejudiced, or with the determined votary of fashion, "who, when truth meets the sight, and pointing shews the way," denies access to conviction—I may in vain expect success. The influence of fashion is such as to blind wilfully its votaries, ever ready to invent any excuse that may appear to sanction their adherence to a favourite custom. Such persons, though the pernicious tendency, of what they defend, may be self-evident, when argument fails them, repel with affected indignation every attempt to insist upon what they will not willingly believe. That the influence of the restraints, the fashions, and the customs pointed out in the foregoing pages, is really the principal cause of the deformity we have been con-

sidering, has ceased to be matter of doubt with those, who have carefully investigated the subject.

Observation both of savage and of civilized life proves, that the less the body is subjected to restraint during childhood, the more perfect does it become at a later period. When, indeed, a child is allowed to grow up to manhood, as nature intends, neither badly nursed, stinted in food, limited in exercise, nor deprived of useful amusements; neither fettered by the restraints of dress, nor subjected to the confinement of unnecessarily prolonged school hours, or to any of the more injurious customs of civilized society, it will be found perfect and erect in form. In such an individual the back rarely becomes deformed, unless from constitutional disease, by no means a necessary, but rather a rare concomitant of the defect now under consideration; the spine is found perfectly perpendicular, as regards its lateral aspect, and is liable to no distortion, but such as may result from accidental injury, or from long continued and excessive labour. Such

is said to be the condition of the form among savage nations, and such is it found to be among others, who though not deemed savage by mankind, may, from the imperfect nature of their institutions, and from their total ignorance of the arts and sciences, fairly be called uncivilized. The peasantry of most countries are said to present this perfection of the person. In the East and West Indies, where the children of Europeans are not confined at an early period by dress, but permitted to indulge in such posture or exercise, as the warmth of the climate may dictate, the *lateral* curvature, or *permanent inclination of the spine to one side*, is as completely unknown among them as among the native population.

The children of the British, brought up in warm climates, are generally much finer in form than their parents, and are free from spinal disease, though, from the tall slender figure which they assume both in New Holland and America, they seem predisposed, as far as mechanical configuration goes, to these affections.

In ancient times, when so much attention was paid to the physical education of youth, the development of the frame must have been highly symmetrical; at least we should infer this to be the case from what we see sculptured on such fragments of ancient Grecian art, as time and barbarism, united to tyrannical oppression, have allowed us to snatch from the mouldering relics of the earliest votaries of science. In the present day, the system of education has undergone a material change, our institutions, habits, and customs, being widely different from those of ancient times. Physical strength is no longer regarded by the higher orders of society as an object of much importance; mental energy alone claims every attention. They forget that, although a vigorous mind may sometimes dwell within a care-worn ricketty frame, and although such a mind by no means always accompanies brawny magnitude, or florid health of body, nothing tends so much to the due performance of all the mental operations, as a sound, a vigorous, a well made frame. The mind has no actions, which it performs in a state disse-

vered from the body. At each distinct operation of its subtile labour, it exhausts a fixed and definite proportion of nervous energy, and cannot renew its labours beyond a certain limit, till the blood, rendered nutrient by food, again renovates, in its course, the nerves, whose power has been exhausted. Hence, exercise is not only useful in adding to the symmetry of the form, but also in lighting up and invigorating the spark by which that form is animated and beautified.

Let not those who do not, after what has been said, satisfactorily understand the subject, neglect, on that account, the arguments here advanced, or regard the conclusions drawn from them as devoid of foundation. Some men are ever prone to disbelieve what they cannot comprehend, or to cavil at what they are unwilling to credit. Others mistake the unintelligible for the wonderful, and refuse that confidence in the simple resources of nature which they repose in the miraculous pretensions of empiricism. Though the cultivation of the mind be, undoubtedly, an object of the highest importance, yet we should not

forget, that man has a body; or that, however the language of Stoic philosophy may designate the earthly tenement of the soul a clog, a hovel, or a prison, the mind a flower, a jewel, or a treasure, the human individual, being composed of both body and mind, each of these respectively demands his care. I should, indeed, like to see the argument of the moralist, who would undertake to contend that he has a right to neglect the cultivation of either. The pedant may affect to disregard the trifling evil, *spinal deformity*, as he affects to disregard every other physical infirmity; the Cynic may sneer at personal symmetry, as he sneers at all other human excellence; but I know of no principle that authorizes a wanton neglect of, or deviation from, the standard of physical perfection. Nor is the question so trifling in importance as the cultivators of mental accomplishment only may be disposed to imagine. There would, perhaps, be less vanity in the world were there less physical inequality. In every instance, moreover, in which we avert deformity, we stop at least

one fruitful source of mental inquietude, or even of bodily suffering. It would afford room for much interesting speculation were we to trace the mysterious connexion that exists between corporeal and mental defects; to inquire into the causes of the harshness of a Johnson, and the melancholy of a Pascal. But there is one consideration, which the prudent parent will do well not to overlook. If there be a good quality which, more than all others, conduces to comfort and happiness, it is—good temper. Deformity is almost always irritable and ill-tempered. With many, indeed, trials of this nature have been attended with the happiest effects, have exercised patience and strengthened fortitude. The parent does not, however, thence, derive any right to expose his offspring to such trials. By cultivating those blessings, which Providence in his bounty may bestow, the beauty and fragrance of the flower, as well as the richness and flavour of the fruit, he will shield himself from the mortification of beholding the most brilliant endowments paralysed by the baneful influence of

trivial defects, and secure for himself the enjoyment of that, which far surpasses all the triumphs of the ball-room, all the exhibitions of the study—the domestic happiness of his child.

THE END.

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